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Metallic Powders
In Rubber Goods[1]

WEBSTER NORRIS

Making and coloring bronze powders is an old German art. The bulk of powdered metal is now made in America from pure aluminum or an alloy of aluminum. Its application in rubber work is limited to conferring heat conductivity in hard rubber base compounds, to protection of fabrics against deterioration by oxidation and light, and for producing ornamental effects on rubber novelties.

Metallic powders, commonly known as bronze powders, have certain important applications in rubber work for compounding and as special surface finish on goods for protective as well as ornamental effect. Strictly speaking bronze powders are made from bronzes or alloys of copper and spelter (metallic zinc). The presence of copper in connection with rubber or rubberized fabric is not accepted as good practice because the action exerted by copper is promptly destructive of rubber, particularly in thin films.

Kinds and Grades

The art of powdering metals is very old. It originated in Germany where it was developed from the gold beating art. The copper-zinc alloys from which German bronze powders are made vary from 87 to 35 per cent copper and 15 to 65 per cent zinc.

The name "Aluminum Bronze" has been given to powder produced from a copper-aluminum alloy containing 10 per cent of aluminum. This material has a golden color but is not bronze. It, however, is so known in the trade.

Another and the most important form is powdered pure aluminum familiar in aluminum paints. Under the name of "Albron" it is prepared in a number of grades as given below.

Grades of Albron

Name	Mesh	Finish	Use
Standard Varnish	140	Polished	Paints
Extra Brilliant Varnish	120		
Extra Fine Varnish	160		
Standard Lining	180		
Extra Fine Lining	200		
Superior	220		Special
Rubber Compound	140	Unpolished	Compounding
Standard Litho	140	Polished without grease	Dusting only
Extra Brilliant Litho	120		
Extra Fine Litho	160		

Dyed Bronze Powders

The brilliant gold and copper colorings of real bronze powders are natural effects due chiefly to variations in the proportions of copper and spelter and the heat treatment of the product. Blue, green, crimson, violet and brown colors are obtained by aniline dyes applied to aluminum powders.

The powder is boiled in a mixture of alcohol, glycerine and other ingredients with aniline dyes. The vehicles are subsequently removed by washing the powder leaving the color upon the surface and within the texture of the metallic particles.

Making Metallic Powders

The reduction of the bronze alloys to powder still follows the scheme of the old German method. Melted alloy or metal is allowed to drop on to a revolving steel disk causing the metal to cool in thin flakes or spattered forms. The spatterings are reduced to powder in two operations, the first stage of which is called "schotting" or "flittering." It is accomplished by dropping 100 pound steel rods onto the spattered metal against an enclosed anvil. The flaked product after schotting is reduced to its final powdered state in stamp mills with steel hammers. This stage of the process goes on many hours to attain the desired fineness. When completed the powdered metal is dull in color, and is given lustre by polishing upon itself in a steel tube containing several revolving brushes. Stearic acid or a special lubricating preparation is added to the powder to assist the polishing, reduce the heat of friction and develop the all important characteristic of "leafing" effect of the powder.

Leafing is the ability of lubricated flaky particles of the metal when stirred about in oil or other paint vehicle to form at the surface of the liquid a continuous metallic film.

Edwards in his book on aluminum powder[2] remarks as follows on the phenomenon of leafing:

[1] Copyright by Webster Norris, March 1, 1929.
[2] "Aluminum Bronze Powder and Aluminum Paint." By Junius David Edwards. The Chemical Catalog Co., Inc., New York, N. Y., 1927.

TYPICAL METALLIZED STOCKS

BRASS DUST SHEET PACKING

Smoked sheet rubber	30
Plumbago	45
Brass dust (burnt)	**11**
Lime	2
Sulphur	12
	100

Sold as uncured calendered sheet.

BRASS DUST VALVE RING

Smoked sheet rubber	25
Fine graphite	50
Brass dust (burnt)	**12**
Lime	2
Sulphur	11
	100

Cure 1 hour at 302°F.

SOLID TIRE RIM BASE

Smoked sheet rubber	34
Carbon black	3
Zinc oxide	9
Aluminum powder	**8**
Lime	14
Litharge	5
Sulphur	27
	100

Cure 5 hours at 287°F.

SOLID TIRE RIM BASE

Smoked sheet rubber	36.0
Aluminum powder	**9.0**
Lime	18.5
Sulphur	36.5
	100.0

Cure 4 hours at 287°F.

STEEL RIM CEMENT

Smoked sheets	32
Aluminum powder	**11**
Red oxide of iron	10
Lime	15
Sulphur	32
	100

Cure 4 or 5 hours at 287°F.

"The ability to leaf is determined by the properties of both the powder and the liquid. Unpolished powder, practically speaking, will not leaf in oil or varnish. The film of polishing agent placed on each particle during the polishing process is what confers this property. . . . Naturally the kind of polishing medium employed, as well as a variety of other factors, influences the final results."

Aluminum Powder in Rubber Compounding

Aluminum powder as a rubber compounding ingredient has been used for the past 12 or 15 years chiefly in the calendered ply of hard rubber and the hard rubber cement used for the attachment of solid tire tread stock to steel rims. The object of its use in this connection is only to render the rubber ply containing it highly conductive to heat and thus facilitate the cure of the interior of the tread rubber. The proportion of aluminum powder used is 8 or 9 per cent in the batch corresponding with 23 to 25 per cent on the rubber content.

The grades of metal commonly used in these mixings are "Rubber Compound" or "Standard Varnish," 140 mesh. The presence of the aluminum in no way improves the value of the rubber stock nor increases its power of adhesion to the steel rim. Among the typical stocks given are two examples of metallized rim base stocks and one of steel rim cement. There is given below a solid tire tread formula to be used with the metallized base ply and cement stocks.

SOLID TIRE TREAD

Useable with Rubber-Metallic Bases and Cement Stocks

Smoked sheet rubber	50.0
M. R.	4.0
Barytes	20.0
Litharge	7.0
Zinc oxide	15.0
Sulphur	3.5
Lime	0.5
	100.0

STEPPED CURES

Tires under 5 inches require 45 minutes to reach 287°F. and are held 3½ to 4 hours at 287°F., according to size.

Tires 5 inches and over require 45 minutes to reach 287°F. and are held at that temperature for 4½ to 5 hours, according to size.

Hazards of Aluminum Powder

The following on the fire hazards of aluminum powder is quoted from Edwards:

"Keep the powder dry; in contact with water it may slowly react and heat as a result. In case of fire, *do not put water on aluminum bronze powder*. Smother the fire with sand without disturbing the powder which may be burning. Keep the premises clean and free from accumulations of aluminum bronze powder as "dust" on ledges and horizontal surfaces. With intelligent handling, the hazard in using aluminum bronze powder is less, for example, than in handling the volatile thinners of the paint trade." A special contribution on handling aluminum powder is available from governmental sources.[3]

Brass Plated Steel Rims

Brass plated steel rims are frequently used to receive hard base rubber, compounded either with or without aluminum powder. The object being to secure the stronger attachment obtainable between brass to rubber over steel to rubber. This is along the line of "copperizing" small steel shafts for improving the attachment in making small rubber covered rolls.

Metallized Dental Plates

Another example of metallized hard rubber is the stock made for dental plates. In this instance the proportion of aluminum powder is sufficiently large to produce on the cured dental plate a continuous metallic surface and luster owing to the leafing characteristic of the aluminum powder.

The grade of metal used is "Extra Fine Litho." The cure is 20 minutes to reach 302° F. and 30 minutes at 302° F. This type of dental rubber has considerable popularity in American dentistry as a substitute for gold plates.

Metallized Packing

For many years sheet packing for steam joints has been manufactured containing brass dust obtained as a by-product of pin manufacture. While this practice, involving the compounding of a copper alloy in rubber, is contrary to acknowledged best practice, yet packing of this description is successful in service. A typical mixing for this packing is given in the examples of stocks. It is shipped to the consumer as unvulcanized calendered roll stock and is cut by the engineer on the job to fit the flange joints of steam lead lines. The joints vulcanize in service and require more or less tightening up as the cure progresses. The advantage of the uncured condition as received is a substantial matter of economy for the user who can receive credit from the manufacturer by the return of the unvulcanized scrap.

Burnt Brass Dust

In the formulae containing brass dust the metal is designated as "burnt." This condition is necessary for the positive removal of any oil or grease that may be present. The burning of brass dust is effected by saturating a few pounds of the material with gasoline in a heavy iron kettle, igniting it in some safe place in the open, stirring it well with an iron paddle to expose the interior of the mass to the flaming gasoline.

[3] "The Inflammability of Aluminum Dust." By Alan Leighton, Bureau of Mines, Technical Paper No. 152, Jan., 1919.

Balloon Fabric Coating

Aluminum powder is applied to the exterior surfaces of balloons and lighter than air craft as a protection for the fabric and rubber coatings of the gas bags and outer envelopes. The rubber coating in two-ply balloon fabric is very thin, usually about one millimeter in thickness. A surface coating of aluminum powder supplies protection to such a fabric from sunlight with but little additional weight. The aluminum coating by reason of its ability to reflect most of the sunlight minimizes the changes of temperature.

It is for this reason that aluminum powder is applied to the outer envelope of rigid air ships where the fabric is not rubbered nor made gas tight. For such fabric coating purposes aluminum paint is used with either varnish or pyroxylin as vehicles.

The application is made in three coats as follows: (1) a brush coat of clear cellulose acetate dope to impregnate the fabric, fireproof it, shrink its surface and prepare it for the succeeding coats; (2) two coats of cellulose acetate dope containing "Standard Lining" powder, one quarter pound to a gallon applied with a spray gun; (3) one sprayed coat of clear dope. The preparation of cellulose dope is not within the province of a rubber plant, however the rubber manufacturer may employ it.

Occasionally raincoats may be seen with the lapels featured by being coated with an application of aluminum powder. In this example as in the case of balloon fabrics the aluminum powder is not used as an ingredient in the rubber composition. It is a paint coating mixed with a vehicle such as cellulose acetate or pyroxylin. Any polished aluminum powder can be used for the purpose.

The polished powders vary only in particle size running from one that will all go through a 120 mesh screen to a powder all of which will go through a 325 mesh screen. The coarser powders give a coarser but brighter finish and the finer powders a smoother but duller finish.

Bathing Caps and Balloons

Dipped gloves, toy balloons, bathing caps dipped or molded and other novelties may be ornamented by means of brilliant aluminum powders in various colors. In general the application of the powder can be accomplished by following one of several plans as is best suited to the case in hand.

1. The aluminum powder may be incorporated in the rubber mixing to the desired color. If for molded goods the stock should be dusted with the metallic powder before being placed in the molds.
2. If the mixing is for dipped goods the metal may or may not be in the rubber mixing but before or immediately after acid curing the article should be dusted with powder of the desired color.
3. After vulcanization and before removal of the dipped article from the form it may be coated with a thin rubber cement and the metallic color be applied upon the wet cement.

This bright colored metallic colors of true bronze powders discolor and lose their brilliancy in contact with sulphur and are unsuitable for rubber makers' use.

Makes Mexican Tires Mandatory

Equipment of all official cars and trucks with tires made by the El Popo rubber factory, Mexico City, is made mandatory by official decree. The Cia. Hulera El Popo is reported by an American consular report to be steadily increasing its output and its products are said to be more than holding their own with foreign makes.

Tire Cord Fabric

The following is from a paper read by Mac Rea Parker at a meeting of The American Society of Mechanical Engineers in Akron, January 10, 1929.

THE best cotton for mechanical purposes comes from Egypt and is largely grown around the Delta of the Nile. This cotton has a staple of 1⅝ to 1¾-inch and its color is yellowish or a tan cast. This is the cotton most desired for production of cord fabric for tires.

One of the essentials in cord tire fabric is a sustained and uniform high quality. Quality is affected both by the source of supply and the care in manufacture and this explains why the leading tire manufacturers have gone into the production of their own fabric.

A cord for tire purposes is essentially a multiple twist yarn. It is a general practice to take five of the single yarns as they come from the spinning frame, twist them together and then take three of these twisted yarns and twist them together. The result is a compact yarn composed of fifteen single strands. A number 23 singles yarn is that commonly produced for this purpose and the resultant cord is known in the trade as a 23/5/3 construction. In this formula the size of the single yarn is stated first, next the number of these in the original twists and finally the number of those which are twisted into the final product.

Construction of Tire Cord Fabric

In the earlier days the cords were laid parallel to each other and in sufficient number to give the desired width of fabric, and these were interlaced with a very light yarn running transversely and spaced approximately 1½ inch apart. This interlacing yarn or filling, was woven in with a shuttle in the loom after the usual manner of weaving. This filling yarn served the sole purpose of keeping the cords in line and evenly spaced, as it was not intended to sustain any of the stresses set up in the tire. From the standpoint of weaving, this design presented no difficulties. However, the resultant fabric was unsatisfactory for coating with rubber compound, inasmuch as the filling yarn tended to shield the cords from contact with the rubber, with the result that a uniform coating was not obtainable. Also the compound tended to collect against the filling where it served to form an uneven piece of rubberized fabric. Accordingly this method of weaving has been to some extent replaced and much of the cord fabric produced today is the result of feeding parallel warp yarns first through a bath of latex and then over heated drying rolls. Thus a perfectly flat fabric is obtained in which the yarns are held together by the cementing effect of the latex. This type of fabric lends itself readily to a uniform treatment.

Commercial Use for Bentonite

As a result of investigations conducted by the Bureau of Mines, it is announced that extensive commercial uses will probably be found for bentonite, one of oldest and least known mineral substances. Certain bentonites have such strong affinity for water that they are capable of absorbing more than ten times their volumes of water. Owing to its peculiar physical properties, bentonite has been suggested as a component material in the manufacture of commodities, as diversified as paper, rubber, putty, phonograph records, pencil leads and soaps. On the other hand, underground deposits of bentonite have caused great difficulties in the drilling of oil wells, it frequently becoming necessary to take special steps to combat the nuisance. Bentonite contains 75 per cent or more of the crystalline claylike minerals montmorillonite or beidellite.

Goodyear Experience in

Temperature Control of Mill Rolls

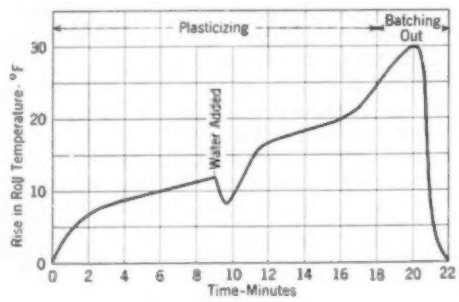


Fig. 1.—Plasticizing

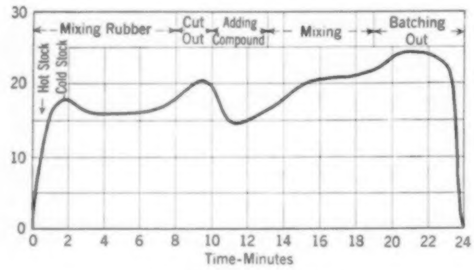


Fig. 2.—Hot Mixing

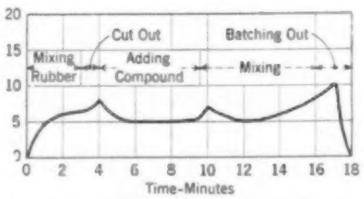


Fig. 3.—Cold Mixing Tread Stock

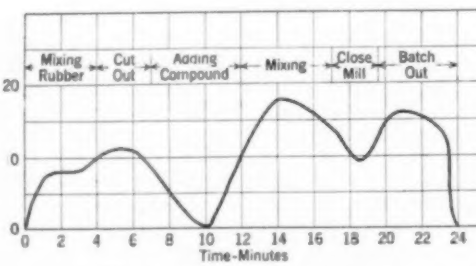


Fig. 4.—Heavily Loaded Stock

NOTE—Publication permitted by *Ind. & Eng. Chem.* Paper read at the Akron Group Rubber Division A. C. S. meeting held in Akron, O., Dec. 3, 1928.

R. W. MOORHOUSE

Goodyear Tire & Rubber Co., Akron, O.

IT is well known that in milling a batch of rubber or compounded stock, the temperature of the mill rolls rises—rapidly at first, then more slowly—to a given temperature at the end of the run. There are, however, a number of factors which affect in varying degree not only the temperature eventually reached, but the intermediate temperature of the roll surfaces. Of these we may form two groups, those tending to increase and those tending to decrease the temperature.

Factors Affecting Roll Temperature

Initially high temperature of batch, toughness of the rubber or stock, heavy loading, large bank and gage and increasing ratios of roll speeds, tend to increase the temperature. Merely starting the average cold rubber through the mill increases the roll temperature 15° F. in the first five minutes, while using hot stocks increases this to 20° F. in two minutes.

Toughness of stock affects roll temperature by varying the amount of heat produced in the first few minutes of milling, the rise of temperature increasing with the tougher stock.

Doubling the gage of the mill increases the roll temperature 10° F., due to increased working of the batch. The same effect is obtained by increasing the size of the batch, up to the point of producing an idle bank.

As small a change of ratio as from 1.11 to 1.17 will produce a rise of 10-12° F. in roll temperature.

Cooling may be obtained, but only momentarily, by the addition of cold compound or a little water to the stock on the mill.

Of far more importance in lowering the roll temperature is the more efficient use of more and colder water. We are limited in the Akron district in amount of water, as well as by seasonal temperature variation, unless we resort to circulation of refrigerated water. This is not considered the correct solution with present conditions at Goodyear, although certain other plants have found it practicable.

A further handicap in temperature control is the very great time lag between roll surface and cooling water temperature changes. In the average thick-walled roll, this varies from five to ten minutes; in the new thin-walled rolls from one to two minutes.

Temperature Measurement

Formerly the roll temperature was gaged by the hand, and by the appearance of the batch. More recently we have used thermocouples in one form or another, such as the Cambridge, the Thwing and the Bristol portable pyrometers. While in isolated cases we have used a fixed type of instrument, the portable type is preferred, since conditions at a mill give rise to considerable risk of damage to fixed equipment.

The use of any surface temperature indicator is complicated by the fact that the roll surface is moving at a relatively high speed and carries with it an invisible film of rubber or stock particles. These factors tend to neutralize each other, as the speed generates frictional heat in any instrument contact, while the film partially insulates the contact from the roll. The net effect on temperature has been found to cause as much as 14° F. difference between moving and stationary rolls. Besides this, the motion of the roll increases the cooling rate where exposed to the air, and carries a film of air between the contact and the roll, still further lowering the indicated temperature.

There is also a variation in temperature across the face of the roll, due to varying thickness of metal, conduction of heat into or from the journals and uneven distribution of cooling water. Dirt and slime in rolls and spray pipes are responsible for poor distribution of water, causing variations as great as 25° F. In the case of a constant stock-feed mill, that point of the front roll from which the feed strip is being taken runs from 10 to 15 degrees hotter than the rest of the roll, probably due to increased working at this point.

Differences between front and back rolls have been found as high as 20° F., with equal water flow. This will vary from mill to mill, but is reasonably constant for the same mill with the same stock.

The errors and variations mentioned are far larger than those obtaining in measuring temperatures of fixed surfaces, which average 5-7° F. for thermocouples.[1] The errors of measurement, incidentally, are traceable entirely to the contact as any of the instruments used are correct within 1° F.

Temperature Cycle

Different milling operations, due to different combinations of the factors noted above, show definite roll temperature "cycles," characteristic of the particular operation. Temperatures of the middle of the back roll were taken with the Bristol portable pyrometer, and are plotted against time in the accompanying curves.

Figures 1 to 5, inclusive, illustrate typical cases of plasticizing, hot and cold mixing high black stocks, cold mixing a high zinc stock, and mixing a coat stock with a large amount of well-plasticized rubber.

The steady increase of roll temperature in plasticizing is very evident, the addition of water only momentarily checking it. Even more rapid is the increase when slabbing off is started.

We can see plainly in the mixing curves the heating effect of the first addition to the mill and of working down the bank by cutting out and by batching off. The cooling effect of adding the compound, followed by the heating up as the compound works in and as the cut-out is replaced being quite visible. The quick drop after the batch has been taken off is very noticeable.

The temperature ranges vary from about 5° F. in mixing soft coat stock to 30° F. in plasticizing rubber. The rate of change of temperature varies from 2 to 10° F. a minute, the greatest rate being found at the start of hot mixing, and in the final cooling period after slabbing off.

Figure 6 shows the heating of a constant feed mill operating on a tread stock. There is evident a considerable range —40° F.—of surface temperature and a rapid cooling after each run, both of which conditions make for considerable variation in stock.

Advantages of Control

While these curves show the actual ranges obtaining in practice with the standard uncontrolled mill, they cannot be considered as ideal for the operation in question. Too cool a mill, even in the case of a feed mill, will lower plasticity,

[1] Bauer & Buss, *Ind. Eng. Chem.* 18, 728. Adams & Kean, *Ind. Eng. Chem.*, 18, 856.

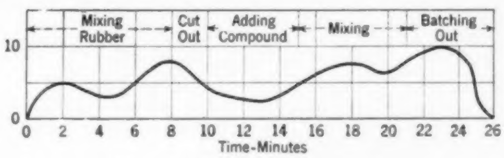


Fig. 5.—Mixing Coat Stock

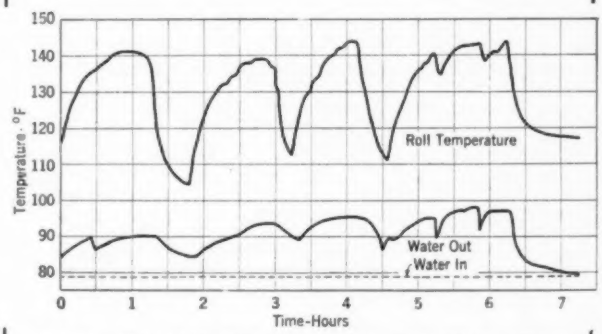


Fig. 6.—Feed Mill Temperature Constant Water Flow

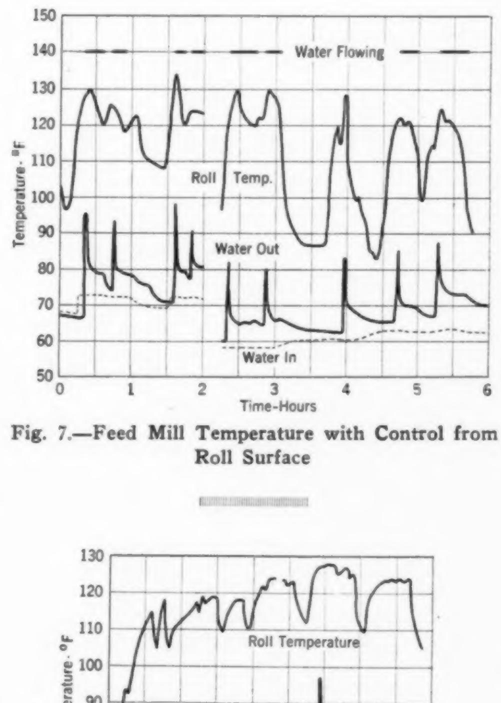


Fig. 7.—Feed Mill Temperature with Control from Roll Surface

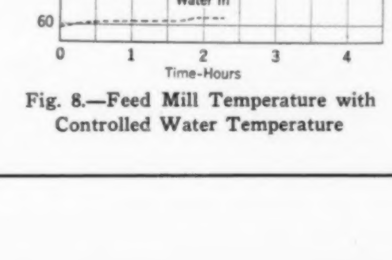


Fig. 8.—Feed Mill Temperature with Controlled Water Temperature

while too hot a mill permits too much of the original toughness to remain in the finished stock. There exists, therefore, an uncontrolled variation in stock quality aside from that already present.

A total range of mill roll temperature of 15° F. is considered the maximum for production of uniform stock. The location of this range will, of course, vary with the stock, from a start of 110° F. or lower for breaking down, to a start of 130° F. for mixing and warming up tube stocks. Feed mills are best operated on even closer specifications, a difference of 5° F. between calender and mill being the desirable maximum.

Aside from the advantage of stock uniformity, there is increased efficiency in the use of water, a point of no small value to us in the Akron district. There is also a saving in actual water used, since no water is used between batches.

Methods of Control

There is but one way to control the variation of temperature in a mill, *i.e.*, to vary the cooling capacity of the water fed into the rolls. There are, however, several ways to vary the cooling capacity, which depends upon the amount and temperature of the water and the manner of its application.

The simplest and least satisfactory control is by reading the temperature with a portable pyrometer and manually changing the setting of the water valve. The labor involved is enough to make this method uneconomical for close control, as the change in temperature is seen to be very rapid in every type of operation. This method can be used, therefore, only to fix approximately the location of the temperature range at which the mill operates. At Goodyear, we have made measurements several times a shift, adjusting the water valves to give more or less water, according to the readings and the stock being worked. The net result is a balancing of the water supply according to the characteristics of the mills, with a general increase in mill room efficiency.

Continuous control means, therefore, automatic equipment, such that as the rate of heat delivery to the roll changes, the rate of heat removal changes proportionally. Since the roll temperature controls and indicates the rate of heat delivery, an automatic water control operating from the roll surface should give good temperature regulation.

Equipment was, therefore, constructed, using a standard Tycos controller, the bulb carried in a bronze shoe riding on the back roll of a feed mill, and the controller operating a reverse-acting diaphragm valve on the water feed line. The mill was used for obtaining the data for Figure 6, and was operated under similar conditions. Several runs were made and the results plotted in Figure 7. The temperature with the stock on the mill was 120° F., after the roll had warmed up. However, while the water was shut off several minutes before the stock was run off, the roll continued to cool, due apparently to the large amount of cold water still in the roll. This caused a period in the next run during which the stock was milled on a cool roll, a condition no better than that obtaining in the uncontrolled roll of Figure 6. It is possible that reducing the head pressure on the water line (and hence the water flow) will cause less variation in the water temperature within the roll, and therefore less roll temperature variation between runs. A direct-acting diaphragm valve will also tend to eliminate sudden and wide fluctuations within the roll. As it was, the controller gave a rise in roll temperature three times as fast as the uncontrolled roll together with a lower maximum temperature and a much lower water consumption.

Since roll surface operation of the controller caused large fluctuations in the outlet water temperature, as shown by the lower curve in Figure 7, control of this temperature was tested. Two air-operated controllers, made by the Bristol company,[2] were attached to the same mill, and runs made under the same conditions as before. While it was believed that the lag from surface to water would increase the variation in the surface temperature during a run, we found that this variation was reduced to about 5° F. The cooling between runs, instead of being 40° F. as in the two previous tests, was only 20° at its maximum. Further, the roll heated up equally as fast as with the surface control. Water consumption was approximately that of the surface control, and the outlet temperature was far more uniform, indicating increased efficiency.

Future Development

While the methods of automatic control detailed above have yielded very encouraging results, especially in water saving, there is room for improvement in the elimination of the cooling between runs.

Since the temperature of the stock on the mill is, in the ultimate analysis, the important item, its continuous measurement and means to use this measurement to automatically control the flow of cooling water become of prime interest. This problem requires some further study of equipment. It may depend for its solution on the use of radically different methods of cooling mills having much thinner walls than any now available. The successful solution of the problem, however, will repay the effort, in the elimination of one of the troublesome factors in the industry, the interference by hot mills with continuous production of sensitive stocks.

Thanks are due to the Goodyear Tire & Rubber Co. for the opportunity to present this paper, and to C. H. Smith of our organization for his work in collecting a large part of the data.

[2] INDIA RUBBER WORLD, July 1, 1927, p. 201.

Rubber Association of America

Service Managers Tire Manufacturers Division

A MEETING of the Service Managers Committee, Tire Manufacturers Division, of the Rubber Association was held at the Park Central Hotel, New York, N. Y., January 24 and 25. The meeting was well attended, representatives of ten companies being present, and a number of matters of interest were discussed during the two-day session.

It was announced that the directors had appropriated funds to defray the cost of printing and distributing tire educational booklets and posters during 1929. The booklets "Tire Care," "The Care of Tires for Trucks and Buses," and the poster "Inflation Pressure Chart for 1929 Model Cars" will be revised and reissued. The Association will arrange with car manufacturers for the distribution of the booklets to purchasers of new cars, trucks and buses. The poster is distributed to gas-filling stations and garages throughout the country. Tire dealers are expected to secure their supplies of the booklets and poster from the manufacturers whom they represent.

B. W. Huling of The B. F. Goodrich Co. was elected Chairman of the Committee, and G. A. Wiedemer of the Seiberling Rubber Co. was elected Vice-Chairman for the current year.

Fifteen Tire Makers Export

The 1,924,000 automobile tire casings shipped abroad during the nine months ending September 30, 1928, were, according to United States Government reports, exported by some fifteen American manufacturers, the remaining 105 being apparently little concerned with overseas trade.

Curing Rubberized Fabrics

S. G. Byam

For many centuries rubber has been used to coat fabrics for protective apparel. The Spanish invaders of South America waterproofed their cloaks with latex, and the Brazilian natives mixed sulphur with latex before spreading it on cloth. In 1791 Samuel Peale of London spread hot rubber on cloth. In 1825, Charles McIntosh of Manchester, produced a double texture water-proofed garment using rubber as the combining medium. This is really the start of the rubberizing industry. In 1839 Charles Goodyear discovered that rubber treated with sulphur in the presence of heat became vulcanized, and this invention gave the rubber industry its beginning.

After Charles Goodyear's discovery of vulcanization the art of manufacturing rubber goods progressed slowly until the advent of the motor car and pneumatic tires when advancement became phenomenal. The rubberizing of fabric has been carried on commercially with processes developed during the middle and late 19th century period and has only slightly changed as to essentials up to the present time. The production and use of accelerators, together with present-day manufacturing efficiency is fortunately making us realize that much can be accomplished in the proofing industry and that a considerable advancement in development of product can be made. It is felt that much improvement in the manufacture of rubberized fabrics lies in a thorough understanding of curing processes and that some discussion of this matter might be carried on to advantage, hence these comments on curing.

It should be apparent from this article that we have a great deal of confidence in dry heat curing for rubberized fabrics, but it must not be assumed that we have an idea that other frequently used methods of curing are necessarily inferior. We refer particularly to the sulphur chloride cure which is in common use. This method has advantages, specifically with regard to speed, economy and effect (or lack of effect) on the rubber surface, and without question produces goods of excellent value for certain purposes. We recall a reference made about three years ago by a well-known rubber technician that sulphur chloride cures produced inferior goods. This was unfair and no doubt due to misinformation, or probably to lack of direct experience, but it was nevertheless a harmful remark. This curing method has value, and the fact that we believe the dry heat cure may be better for goods used under certain conditions should not be construed to indicate the inferiority of the sulphur chloride process. It indicates rather that the proofer should thoroughly study his products and their uses as well as these types of curing so that he may employ the method most suited to the greatest number of conditions involved.

Sulphur Chloride Cure

Regardless of the entire mechanism of the sulphur chloride cure it may be considered that sulphur monochloride adds directly to the rubber molecule, producing properties of elasticity, freedom from effect of temperature changes and strength, similar to those resulting from a heat-sulphur cure. The speed of reaction is so fast as to be practically instantaneous and therefore the cure is effected chiefly at the surface of the rubber. The penetration of the sulphur chloride into the rubber is automatically retarded as the time of exposure is increased because of the rapid hardening action at the surface. This condition constitutes the chief limitation to this type of curing for only thin films of rubber will be adequately penetrated to produce uniform and ample cures. It has been known for many years that the penetration of sulphur chloride into the rubber can be advantageously assisted by an easily volatilized diluent which is a solvent for rubber. It was formerly customary to use carbon disulphide, and except for its poisonous and extremely inflammable nature would still be considered most satisfactory. Safer and less obnoxious solvents like carbon tetrachloride, benzol and high test naphtha are now generally used, though their penetrating ability is less. The more rapidly the solvent diffuses into the rubber the greater will be the penetration of the sulphur chloride and the more uniformly vulcanized the resulting product. This condition is true whether the cure is made with sulphur chloride in gaseous state as in the "vapor" cure or in liquid form as in the "liquor" or "acid" cure.

A further most important step in the proper handling of this cure lies in the complete neutralization of the excess sulphur chloride. This chemical has a strong affinity for water and is readily hydrolized by it with hydrochloric acid as one result of the reaction. Therefore, excess sulphur chloride contained in the cured material may be easily changed to hydrochloric acid by atmospheric moisture with the result that unpleasant decomposition of the rubber may take place. Manufacturers have found that a thorough exposure of the cured goods to aqua or gaseous ammonia will neutralize any excess sulphur chloride as well as any hydrochloric acid which may be present. In addition, inorganic alkalies, such as lime and magnesium carbonate are usually incorporated in the rubber compound to further act as inherent neutralizers of residual sulphur chloride or acid. This neutralizing operation may not at any time be neglected or its necessity questioned if material is expected to have reasonable life. It has been found that anhydrous ammonia may be used effectively and easily and that it is more positive in action due to its being used in greater quantity than aqua ammonia.

The sulphur chloride cure can be used for both calendered and spread fabrics but has more general favor with the latter type on account of their being generally lighter in weight and thinner in rubber film. The usually heavier calendered materials are often too thick to permit deep enough penetration of the sulphur chloride to effect proper curing. Calendered materials are more likely to contain reclaimed rubber than are spread goods and reclaims do not seem to cure as well by this method as with heat and sulphur. It is also probable that spread coatings are in themselves more porous, or at least more absorbent of sulphur chloride, than calendered coatings, which condition makes for less use of this curing method for the calendered materials.

The Peachey Process

Another process of curing was discovered and patented in England a few years ago by Peachey which has aroused some interest. This process depends on the

Note—Mr. Byam is assistant plant manager of the Fairfield Plant, E. I. du Pont de Nemours & Co., Fairfield, Conn.

treatment of rubber with sulphur dioxide and hydrogen sulphide in successive steps. The method can be adapted to the curing of rubberized fabrics and has been exploited with some success in England. It has apparently met with little favor in this country as American chemists seem to feel that at least equally good results can be obtained more practically with sulphur chloride or dry heat. Sulphur chloride cured goods can be produced that are equal to the best produced by the Peachey process and that for many purposes dry heat cured goods are vastly superior. It is said that the curing effect obtained by the Peachey method is a result of the instantaneous action of the atomic sulphur produced in the rubber by the chemical reaction of the sulphur dioxide and hydrogen sulphide to which the rubber has been exposed. As the action depends on the absorption of the gases by the rubber the method must have the same limitations as the sulphur chloride method and so only be effective on fairly thin films of rubber.

The Dry Heat Cure

THE dry heat or oven method of curing is probably the simplest application of Goodyear's discovery that rubber and sulphur unite chemically in the presence of heat. The method as now practised has been used by the trade for many years, and early descriptions contained in the literature differ very slightly from present procedures. It sometimes seems surprising in view of the excellence of heat cured rubberized products that the proofing trade has not used this process to a much greater extent rather than the sulphur chloride cure. However, there have been reasons why the dry heat cure has not been generalized more, such as the difficulties of operation and long periods of time required for dry heat as compared with the simpler conditions for "acid" cures. This condition is changing as chemists study the quality of their products and realize the possibilities of modern accelerators, organic colors, and helpful chemicals like the antioxidants.

It is an indication of progress that an increasing number of dry heat cured products are appearing on the market and that the demand is growing with the trade using rubberized fabrics for heat cured goods. The tendency in this direction cannot help but produce a healthy business condition by the production of goods of better quality and through this the creation of more uses for rubberized products. A rubberizer who wishes to lead his field would do well to have a thorough knowledge of this cure and all the conditions affecting it. He should also plan to constantly study the prevailing conditions so that he can apply his results most effectively.

Carriage Cloth

THE outstanding product which has always been heat cured is carriage cloth, or as it is now termed, automotive top fabric. That this product should have been always heat cured is natural because the conditions of manufacture permit no other method being used. Carriage cloth is relatively heavy in weight, usually has a varnished surface which must be dried or baked and must withstand in service severe exposure to all kinds of weather. Only dry heat curing, together with proper compounding can meet the test. For years the dry heat cure was limited to the use of litharge for acceleration, which fact permitted the production of only black and dark colored goods. We have now stepped beyond this boundary and with organic accelerators are obtaining any brilliant or delicate tint or color desired.

In the case of colored material for carriage cloth a further limiting condition has been that black compounds have aged vastly better than colored ones. However, these limiting features are all being overcome or nullified by technical skill in producing better compounds, long wearing varnishes and other surface effects in color as well as in black. Perhaps the dry heat cure should be given some measure of direct credit for the excellence of the varnished finish of modern carriage cloth, which is well known to last the life of the car in providing perfect protection with a reasonable amount of permanent good looks. The cure plays an important part in properly drying and oxidizing the oils of the varnishes.

The Raincoat Trade

THE raincoat trade is probably the largest consumer of rubberized fabrics, though the automobile industry requires almost as much. Except during periods when double texture fabrics have been in vogue for raincoats, dry heat cured materials have been used only slightly. The vogue for leatherettes during the last two seasons and carrying on this year is a notable exception to this statement for leatherette is a dry heat cured product. It is a fact that the double texture coat has been the most serviceable type of all, credit being due in part to the general excellence of the rubber film between the fabrics and to its being toughly cured with dry heat. The success in the trade of the acid cured light weight coats of the past few years has been in the appeal to women and girls of the attractive and brilliant colors. While such coats have given a real value for their cost, there is little doubt but that a similar material heat cured would give more value at only a slightly additional cost. This seems borne out by the present demand for the highly colored, shiny surfaced leatherette coat. The coat manufacturers seem to recognize a greater degree of quality as well as a different sort of beauty in this heat cured material. Some years ago the so-called but mis-named gas mask fabric dominated the raincoat trade in spite of the fact that it was made up of a very heavy coating on a light weight sheeting which was too weak in tensile strength for the type and weight of coat. The saving grace of the material and, therefore, much of the success of the coat depended on the good quality of the calendered rubber film which was heat cured.

We believe that while acid cured fabrics will continue to be used for rain-coats quality garments will more and more demand heat cured rubberizing. Novelty effects, such as the embossed surfaces and suede leather finish, are obtained in a permanent and satisfactory manner with this method of curing. We further believe that heat cured double texture fabrics are due to become popular during the next few years, or sooner, and that this type of coat will have an attraction in style and finish as well as a high degree of inherent quality that was not obtained when the historical cycle last raised them to popularity.

Rubberized Fabrics

RUBBERIZED fabrics for shower curtains and service aprons for use in the home or industry can be better adapted for the purpose if heat cured, because their use requires resistance to sunlight, acids, soap, greases, etc., as well as water. No acid cured product can compete in a quality test with well made dry heat cured material under such conditions. Hospital sheeting that is made for severe institutional use where it must withstand the action of acids and strong disinfectants should be heat cured, with little choice entering between open steam vulcanizing and the dry heat method. And so on with many products which have been less often heat cured than otherwise.

A promising and significant circumstance was noted in connection with a certain government product involving the use of a rubberized fabric. Tentative specifications were submitted by the government bureau with an accompanying statement that the methods of manufacture laid down were considered to be of less importance than the actual quality of the product itself. That is, it was stated, if the product gave the required service as determined by certain reasonable

tests, the government was hardly interested in the make-up of the goods regardless of the detail of manufacture laid down. This is significant because it seems to represent a changed condition in government bureau attitude not to stress exacting and sometimes impractical specifications and also because it recognizes the idea of allowing a product made for a certain purpose to stand on its merit as determined by those tests which represent the required service.

Testing Rubberized Fabrics

THE testing of rubberized fabrics is most important and provides much valuable information to the manufacturer. One should not overlook the point of testing for the proper quality, which depends largely on an understanding of the use to which the material will be put. For instance, we dislike seeing a cheap percale or cretonne coated with a low grade acid cured rubberizing which is satisfactory enough for low priced house aprons sold to a company who will use it for a shower bath curtain for which far greater aging, quality and strength are necessary. The possible effects of such conditions are dangerous to the continuous employment of rubberized fabrics in that particular field. The tests made should represent the minimum quality necessary for a particular service and the goods should be built to provide enough quality to meet this requirement with a reasonable tolerance of safety in addition.

In applying tests to assure the quality of the finished product one should, of course, make use of those affecting raw materials. The tests for impurities in compounding ingredients are too well known, to give space to in this discussion, but it would be well to mention testing dyed fabrics for dangerous chemicals. It is generally known that copper salts accelerate to an unusual extent, the oxidation of rubber and the presence of copper salts in fabrics to be rubberized may not be tolerated with impunity. Decomposition of rubber due to the action of copper is extremely unpleasant from a sales, as well as from a technical point of view. Even small amounts of copper present in dyed fabrics will cause decomposition, C. O. Weber claiming that as little as 0.01 per cent will cause deterioration. The rubberizer must go far below this figure for his maximum tolerance of copper, 0.005 per cent not being too small for this limit. It usually has been proofing practice to reject fabrics showing a qualitative test for copper by the simple nitric acid-ammonia method, but as this test is not sensitive to 0.005 per cent copper it is considered more desirable and safer to determine copper by the quantitative colorimetric method. While the danger of copper is well understood by most rubberizers, emphasis of this point seems pertinent. The action of the copper is explained as being catalytic, and other salts of manganese, iron, silver, and vanadium also exert deteriorating effects on rubber.

Tests on finished product must include tensile strength, hydrostatic resistance, toughness of rubber film as determined by mechanical scrubbing, edge cracking, accelerated aging and such others as a particular need might require. Tensile strength of finished product is usually important regardless of the use the material will undergo. With single textures it may be considered that the raw grey goods strength is practically the same as that of the dyed rubberized fabric. With double textures it is usually slightly higher on the combined product than the sum of the strengths of the two fabrics in the grey. Knowledge of the strength of the material as well as the strength requirement for the service intended is very essential. Resistance to water pressure is, of course, an effective measure of the usually necessary waterproof quality of a rubberized fabric and its determination is simple with a standard testing machine similar to the Mullin tester for bursting paper. Edge cracking can be determined by hanging a strip of rubberized fabric over a sharp edge under constant tension and permitting weather exposure or accelerated aging to do its work at the same time and is a test which will provide much valuable information regarding the flexibility of a compound. The "scrub" test which simulates the action of rubbing the coating surfaces against each other gives a measure of the toughness or abrasive resistance of the compounds.

Bomb Aging Tests

THE use of the oxygen bomb method of accelerated aging is rapidly supplanting all other methods in the proofing as well as the entire rubber industry. The drastic effect of oxygen at 300 pound pressure and 70° C. on rubber is showing up degrees of quality not realized previously. To the manufacturer of dry heat goods the test is of primary importance in determining extent and uniformity of cure. The necessity for a means of doing this has been recognized for a long time for the condition of variable temperature control in dry heat curing is so hard to eliminate. The bomb aging tests show relative effects of various accelerators on the compound, the value or lack of value of antioxidants on particular compounds, the accelerating or retarding effect of organic colors, and the very important fact that even minute quantities of copper in fabrics cause early decomposition of rubber. Many, if not all, of these conditions may be determined by other means than the bomb aging method, but not with such exactness or rapidity. There is the all important consideration of relation of time of exposure of rubber in the bomb to normal aging to be considered and in this matter one hesitates to lay down a factor. It is thought that the time ratio very probably varies with the type of compound being studied, but because the condition of so-called normal aging is so indefinite and uncontrollable it seems ridiculous to attempt to establish any definite time factor. On some compounds a twenty-four hour exposure in the bomb may be equivalent to six months of normal aging, while with another type of compound one would not dare claim more than three months. It is clear, however, that the actual ratio of bomb aging to normal life is of less importance than the established facts that details of compounding, effect of accelerators and colors and extent of cure show their relations to the life of the goods when exposed to bomb conditions. It seems safer, after one has had experience with bomb aging, to assume that material which stands ten days' exposure in the bomb is definitely and radically better in aging quality than if the material becomes visibly and adversely effected in five days.

While discussing this interesting subject one considers the end-point of the bomb test or in other words, how does one tell definitely when the sample fails. At the present time experience seems to be the best answer. When rubber oxidizes, it resinifies and later hardens, therefore, when cracking occurs the material has failed. But it has also failed when it becomes resinous or mushy and if we work back to the start of decomposition we must find the point at which softening occurs. In view of the fact that oxidation increases the acetone extract of rubber determinations of this condition during the period of aging, might furnish a basis for working out that point at which the material actually starts to fail. We know that there is a very sharp rise in the resin content of rubber where serious decomposition sets in and determining the point just prior to this rise would be the indication of the end of good aging for which we are looking. However, as serious decomposition is entirely obvious because of the physical softness of the rubber and the rank odor of decomposition, it is unnecessary to chemically determine this point and we may as well rely on our experience for placing the point at which rubber begins to go bad in the bomb.

The Dry Heat Vulcanizer

AS in all industries the equipment for handling dry heat cures must be as near right as possible if good results are to be obtained. The equipment for carrying out this method of curing is essentially very simple for it consists only of a large chamber arranged with a heating device for procuring the desired temperature. The average dry heat oven or vulcanizer has a capacity of from five hundred to one thousand lineal yards of festooned or draped material. The material is loaded into the chamber by hand or by a festooning machine which feeds the rubberized cloth from the roll to chain-carried supporting bars. The festoons form as the cloth enters the chamber and are carried into the chamber slowly and automatically as the loading continues. The festooning machine is usually equipped with a varnishing outfit so that such products as automotive fabrics requiring a finishing varnish may receive this application immediately before entering the chamber, the cure then serving the double purpose of drying the varnish and vulcanizing the rubber coating.

Controlling the Cure

IT is customary to heat the chambers with steam, piping being laid about half way up the sides. It is often desirable as well to include steam pipes rather high up the sides at the ends of the oven in order to attempt to compensate for the cold air penetrating around the doors. This arrangement of steam coils permits good distribution of heat, particularly if the steam is controlled by separate valves to several parts of the oven. Due to weather and wind conditions it is frequently necessary to force one part of the heater more than another if a reasonable degree of temperature uniformity is to be obtained thus making the multiply valve control far more effective than if a single controlling valve is used. Various types of automatic controlling valves are available which have more or less merit depending on the degree of circulation within the heater, tightness of the chamber construction and other conditions. They can, without doubt, be installed to control the temperature closely at a given point in the chamber, but it is a grave question if in any heater of this type any one point may be considered to represent a fair average of the various temperatures existant in it.

It is believed that the temperature may be best controlled by hand valves operating on three or four sets of steam coils, the temperatures in the heater being indicated on at least two recording thermometers, the bulbs of which are placed about a third of the distance from each end of the chamber. If these two clocks record uniform temperatures it may be assumed that the heat in other parts of the chamber would not be too much different. It is well, however, to check the temperatures frequently in various parts of the chamber by placing from fifteen to thirty self-registering maximum thermometers in as many parts of the heater and comparing their readings after a full cure with those of the recording clocks. These readings are of great value in calibrating chamber conditions with reasonable accuracy. It is obvious that this knowledge is essential in order to properly adjust sulphur-accelerator ratios of the compounds to be cured.

The heating arrangement described applies chiefly to a curing oven which handles varnished goods where air circulation is dangerous because of the possibility of causing the faces of the material to stick together, or even touch. Dry hot air is very hard to keep uniform in temperature through the action of the normal convection currents alone. If circulation by forced draft is possible, it is possible to obtain a considerable uniformity of temperature with a single valve or automatic valve control. It is always the dream of the technical director to have sometime a good continuous heater, that is, a constant temperature oven through which the fabric passes continuously, thus being subjected in its entirety to the same temperature or temperatures in consummating the curing process. The length of time required for average dry heat curing cycle means that a continuous heater would need to have too great dimensions to be practical or else production would be less than with the usual individually loaded oven.

Adjusting the Compound to the Cure

THE extremes of temperature so often present in dry heat ovens would be fatal to good curing if the technical department did not understand how to offset, or rather compensate for them, by adequate compounding. The compound must be adjusted as to sulphur and accelerator to cure sufficiently at the low extremes of temperature without a resulting undercure and sulphur bloom and still not overcure at the high extremes. To do this requires a delicate adjustment of the compound and a thorough knowlege of the fundamentals of curing and accelerator action. The difficulties of proper dry heat curing in view of such conditions has kept this method in less favor among rubberizers than it deserves, as the results that can be obtained are excellent. For years the dry heat cures have been operated with litharge as the accelerator on account of the comparative simplicity of adjustment to meet the rather non-uniform heating conditions mentioned. It is generally known that a litharge-sulphur ratio of approximately ten to one with a curing time of several hours will usually give fairly satisfactory results. This combination, of course, has its limitations as it is suitable only for dark colored or black compounds as used in most automotive fabric work or for double textures where the color is not essential. It is only recently that the demand for bright and delicate colors have forced the use of organic accelerators with the dry heat cure.

Sulphur Bloom

ONE of the most important considerations in connection with dry heat curing is the prevention of sulphur bloom. This matter causes much trouble to manufacturers and seems more difficult to control properly with dry heat than with other types of products. While bloom is a result of excessive free sulphur it is very hard to learn what amount of free sulphur is safe and also what conditions, other than free sulphur content, cause bloom. It used to be thought that if the free sulphur was present within a half of one per cent the material was reasonably safe from bloom. It is believed that some times this is true because we have known of such cases. On the other hand we have seen material containing under three-tenths per cent free sulphur which has bloomed. From comments made by technical men of considerable experience with dry heat curing we learn that material so cured as to have less than a quarter of a per cent free sulphur is not likely to bloom. We cannot claim, however, that this percentage is absolutely safe and we doubt if anyone would care to stake much on a more positive statement without qualifying as to other conditions.

Bloom is very peculiar in its action and is deserving of study by technical men as to the causes of its appearance. Many rubberizers have had the experience of material containing a low free sulphur content which would show no trace of bloom for several weeks or even indefinitely at their factories and which would show a decided bloom after being shipped to a customer. Just what conditions of humidity, temperature, etc., are responsible for this are not known. It is, of course, common knowledge that material blooms more readily in winter than in summer and that

a sudden change in temperature from warm to cold is likely to produce it. It is perhaps true that dark, cold and moist conditions are more likely to bring out a bloom than any others. We need a test badly which will show positively whether goods will or will not bloom. It is apparent that the free sulphur determination is not definite enough to provide such assurance except within too wide limits to be helpful. We might say that goods with one per cent sulphur are sure to bloom and that with less than one-tenth per cent they will probably not. You can narrow these percentages perhaps but you will still have a gap that is rather wide, hence the need for a more definite test.

Bloom is caused by the migration of free sulphur existing in a compound after curing, to the surface. The cure, as determined by total sulphur content, accelerator type and quantity, temperature and length of heating, must first be set to have as little free sulphur as possible. In order to work the free sulphur to a minimum we approach the point of over-curing with its accompanying harmful effects. The modern organic accelerators are helping us in this matter, fortunately, for we can adjust our compounds with them so that a considerable variation in time of cure can be permitted with little effect on physical properties or aging. Dry heat cures should be made with accelerators of this type which gives the flat curve, the time being set toward the middle of the curve in order to play as safe as possible regarding bloom and undercure on one side and overcure and decomposition on the other. Such accelerators are very active, of course, and require careful handling through the factory operations to prevent scorching. The action of these accelerators must also be studied with respect to other ingredients in the compounds. Organic colors which are meeting with much favor are not always inert; that is, some may have a slight accelerating action and others a retarding action which must be compensated for when adjusting the sulphur-accelerator ratio.

In the above remarks we have reference to a general condition of bloom rather than a spasmodic bloom due to cold spots in the dry heat oven. As mentioned in discussing curing ovens, heaters are known to contain wide ranges of temperatures making it sometimes impossible to obtain goods in places that have had insufficient heat. The curing adjustment must of course be worked out to offset this as much as possible. While, this is a danger in handling dry heat cures, it is controllable to a greater extent than some other conditions, but only through thorough knowledge and exacting control.

Organic Accelerators

THE action of organic accelerators in dry heat curing affords a very interesting as well as useful study. The growing realization among rubberizers, and even the cutting-up trade, that heat cured products contain quality to a degree not approached by sulphur chloride cures is making necessary a greater familiarity with this long but only partially understood cure. We cannot any longer nor do we desire to keep the public from demanding bright colors, and it is only with organic accelerator cured goods that we can supply them. There is a great deal that can be done with organic colors, accelerators and antioxidants in heat cured rubberized fabrics. The manufacturers of accelerators have studied the application of their products and can give much helpful advice for their use in all rubber products, though it sometimes seems that they are less familiar with the action in dry heat cures than in any other, which is perhaps natural. This circumstance, if true, puts a greater burden on the technical departments of the rubberizers than might otherwise be the case in order to keep up to the times and produce the most desirable effects. It is sometimes advantageous to use considerably more accelerator in a compound with lower sulphur than the manufacturer recommends in order to get the best conditions. Doubtless competitive conditions among accelerator makers cause them to work out only the condition where the minimum quantity that will produce a cure is used in order to prove the economy of their product, even though greater amounts will produce more favorable results. We know this to be true in some instances, at least with regard to a relatively high accelerator-low sulphur ratio producing better cured and better aging goods than a recommended higher sulphur-lower accelerator ratio. The danger of pile burning or scorching on the calender with the former method is hardly any greater than with the latter, though in any case definite precautions and careful mechanical handling in the factory are essential.

It is perhaps in order in discussing accelerators to mention that those which will cure at room temperature offer excellent possibilities in some products that are now heat cured. In fact we may find that with their use we can heat cure by merely storing the goods in the roll in warm rooms over night. Double texture goods, of course, are most suitable for such handling. While this work is still new and the applications few, the methods for handling can be worked out to advantage both for economy of operation and quality of product.

Annual Review A.S.T.M.

Rubber and Textiles

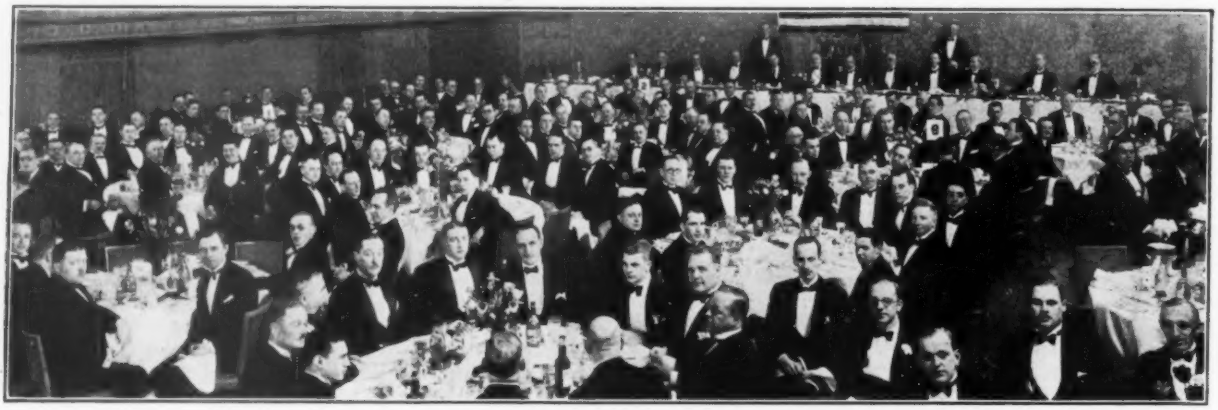
THE Annual Review of the American Society for Testing Materials for 1928 refers as follows to the work on rubber and textiles:

The work of Committee D-11 on Rubber Products within the past year has been largely of an investigative nature. Revisions have been made in the tentative specifications for insulated wire and cable: 30-per-cent hevea rubber in accordance with the recommendations of the Sectional Committee on Insulated Wires and Cables for Other than Telephone and Telegraph Use and revisions were also made in the tentative specifications for rubber insulating tape and the standard specifications for adhesive tape and new methods of chemical analysis of rubber products were submitted. Consideration is being given to the revision of other specifications such as the standard specifications for mechanical rubber hose and specifications for belting.

The committee has been carrying out a number of laboratory and service tests on the abrasion of rubber products. In this connection a paper was presented at the annual meeting by H. A. Depew on "An Explanation of Some of the Difficulties in Abrasion Testing of Rubber." Life and aging tests for rubber products are also receiving the attention of the committee. Various compounds are being investigated when subjected to several types of treatment.

Of outstanding importance is the work of the committee on rubber products for absorbing vibration. In this work the committee has cooperated with the Society of Automotive Engineers in the development of specifications and methods of testing rubber products used in automobile construction such as engine supports, bumpers, spring shackles, torque insulators and universal joints for the absorption of vibration and shock. This work involves the consideration of hardness tests and permanent set tests.

Committee D-11 approved the proposed specifications for rubber-lined fire hose for public and private fire department use prepared by the Sectional Committee on Specifications for Rubber-Lined Fire Hose. It accordingly took action to withdraw its own standard specifications for fire hose. The recommendations of the Sectional Committee are the result of several years' work to arrive at uniform and generally acceptable specifications.



New York Rubber Exchange

Third Annual Dinner

THE third annual dinner of the Rubber Exchange of New York, Inc., was held on the evening of February 15, 1929, in the ballroom of the Roosevelt, New York, N. Y. About one hundred and fifty members and guests were present to enjoy the excellent dinner, following which there were speeches and Russian folk songs. Francis R. Henderson, president of the Rubber Exchange was toastmaster.

The Hon. James J. Walker, Mayor of the City of New York, was the speaker of the evening, and his witty discourse, covering a variety of subjects from civil government to boxing, completely won the interest of his audience.

Francis R. Henderson, then delivered the following address in which the progress of the Rubber Exchange was stressed:

Tonight, gentlemen, we are celebrating the third anniversary of the opening of the Rubber Exchange. A year ago under similar circumstances I pointed out to you that the business on the Exchange was increasing and that the operations had proved, in my judgment, of considerable value to the rubber industry as a whole. It is, therefore, particularly gratifying to review this last year, when conditions arose which we all felt would be a real test of our institution's functioning.

For the benefit of our guests I might mention that trading on the Rubber Exchange is in futures, and while full provision is made for delivery of the physical rubber the primary purpose is that a means of price protection be offered to producer, dealer and consumer alike. Can you imagine a rubber manufacturer allowing his fire insurance to lapse, and being unprotected against such a hazard for any length of time? Yet we had a shrinkage in rubber prices which meant not only a shrinkage in inventory but in forward commitments of 50 per cent within sixty days last year.

Hedging at times is a technical operation and not very well understood by the majority of our producing and consuming friends, but I do not think it out of place to remind the uninformed tonight that it would be to their distinct advantage to go into the matter in a thorough manner. The proper use of Exchange facilities can considerably minimize, if not entirely eliminate, the risks which have attended the building up of an industry so important and necessary as rubber is today.

Rubber restriction was abolished last year because it was found to be a make-shift remedy for low prices. Low prices were found to be unsatisfactory for the consumer, and high prices proved but a boomerang for the producer. Concerted action on the part of either producer or consumer can never attain the desired result of a free and open market such as is provided by a properly functioning Exchange.

One of the purposes of an Exchange is to disseminate to its members all information affecting both production and consumption, and with this information available, trading becomes simply a friendly battle of the opposing forces as to whether the commodity involved will go up or down based on the statistical position. Exchange machinery guarantees the proper performance of both sides to the contract, and the inevitable result is a price level representing the dictation of the economic law of supply and demand.

For two and one half years it was very difficult to attract public participation in the buying and selling of rubber, because the public insists that if they wish to exercise their own judgment as to values any law of fixation encroaches their freedom of action. This has been splendidly apparent since the abolition of the British restriction on production.

Activity on the Exchange has become very much more pronounced, and while prices have moved up as a result they more truly represent the value of rubber than abnormally low or high prices did before.

It has been estimated by those best qualified to know that America will produce about 5,000,000 automobiles this year. This increase, as against 1928, may be entirely accounted for through the increase in exports of cars and trucks.

It is estimated that 80,000,000 tires will be produced this year. This would mean the same increase over last year that was experienced against the previous year.

Obviously, such estimates are not too sanguine when general conditions in this country are considered. What, then, will be the effect on rubber prices? I sincerely believe that the potential supply of rubber in the world is ample for the year's requirements, provided the price will bring out the potential. There are areas, from which we must obtain certain quantities of rubber, where the cost of production is considerably higher than the more favorably situated and managed estates.

Again the law of supply and demand will govern, and if the price is too low to bring the production we need, the tendency will be upward. If, on the other hand, the price reaches a point where new uses are not encouraged, or where too much rubber is available, the tendency will be downward.

At all times our Rubber Exchange offers the best means of expressing divergent opinions, which result in the nearest we can expect to healthful stabilization.

You will be interested to learn that transactions for our past twelve months amounted to 450,000 tons or about 50 per cent increase over the previous year. Inasmuch as each transaction represents a buyer and a seller, over $460,000,000 was involved.

This most enjoyable evening was concluded with a humorous address by Sir Bartle Bartholomew Doyle and songs by Adia Kouznetzoff, basso, and Mme. Zinaida Nicolina, soprano.

Cars Enter Russia Tireless

THE SOVIET GOVERNMENT HAS ORDERED THAT IMPORTED automobiles be delivered minus tire casings so that cars may be equipped with tires made by the Russian Rubber Trust.

Report of the

Raw Rubber Specifications Committee

As INTIMATED in a previous report of the committee presented at the St. Louis meeting in April, 1928, a temporary procedure was adopted in order to ascertain whether or not the five laboratories represented on the committee could obtain reasonably comparable stress-strain relationships using the same batch of rubber.

A complete report is appended in which the procedure is outlined and the results of each laboratory are given in considerable detail.

After careful deliberations the committee has concluded that the testing of raw rubber is not in a very satisfactory state. It therefore makes the following recommendations:

(1) The testing of raw rubber should be made the subject of thorough investigations.

(2) The work should be undertaken by a physical testing committee, preferably under the jurisdiction of the Rubber Division of the American Chemical Society.

The committee wishes to express its appreciation of the aid given to it by The B. F. Goodrich Co. in supplying the broken-down raw rubber employed in these tests.

ELLWOOD B. SPEAR, Chairman
C. R. BOGGS H. L. TRUMBULL
H. E. SIMMONS N. A. SHEPARD

Method

A batch of pale crepe was broken down on a hot mill by The B. F. Goodrich Co. and portions were sent the Firestone, Simplex, Akron University, and Thermatomic laboratories. All laboratories followed the procedure as closely as possible. Goodrich reports using a 600 instead of a 500-gram batch and a higher temperature during the incorporation of the zinc oxide.

Procedure

Firestone Formula. The total weight of the batch was 500 grams. The rubber was cut into slabs about 9 mm. thick and the slabs were cut into strips. Steam was allowed to pass through both rolls in such a manner that a slight hissing sound could be heard at the effluent orifices and a moderate cloud of condensed steam could be seen.

The rolls were opened sufficiently so that the strips of rubber could be joined end to end by a slight squeezing at the overlapped joint as the strips were passed through the rolls once. The long strips thus formed were wrapped around the front roll and allowed to revolve with the roll for 5 minutes. The rolls were then closed little by little so that the rubber was slightly squeezed. As the tightening process was continued the rubber began to spread out somewhat and to decrease in thickness. The squeezing was continued for two minutes, at the end of which time the rolls were tightened until a very thin sheet of rubber was formed around the front roll. The rolls were then backed away slowly in order that a continuous sheet of rubber might be formed. Finally the bank was reduced in size until it was approximately 25 mm. in diameter.

The zinc oxide was milled in, the process occupying three minutes. The rubber was then cut rapidly back and forth for five minutes. During the cutting the steam was turned off the back roll but was allowed to pass through the front roll.

The cutting was done in such a manner that the slit was started at the outer edge of the rubber and continued into approximately the middle of the roll. The end of the rubber thus freed was turned back on the roll so that the outer square corner of the slit was brought into the middle of the roll. This method insures thorough mixing and prevents the formation of pronounced grain.

At the end of the mixing process the rolls were backed away so that the rubber did not touch the back roll, the steam was turned off the front roll, and cold water was allowed to pass through both rolls for 1 minute. The water was then turned off the front roll, but was allowed to pass through the back roll until it was warm but not hot to the hand. The time required was seven minutes. The mill was, of course, in operation during the cooling period.

The rolls were then tightened until the bank was again about 25 mm. in diameter. The rubber sheet on the front roll was perfectly continuous and smooth. The accelerator and the sulphur were then milled in together, the process occupying two minutes.

The rubber was again cut rapidly back and forward for five minutes. At the end of this time the rolls were tightened to the required degree and the sheet was cut off the mill in the ordinary manner. The thickness of the sheet should be slightly less than 2.5 mm., if the curing molds are such that the cured sheet is to be approximately 2 mm. thick.

The sheets were cut out the full size of the mold in such a way that the test pieces would be lengthwise around the roll. The raw test sheets, while still warm, were put into a desiccator over calcium chloride and kept there until they were taken out to be put in the press, 2 to 5 hours after milling.

The curing was carried out for the periods indicated on the enclosed sheets. The cured sheets, after removal from the press, were chilled with cold water, cut to size, dried with a cloth, and finally thoroughly dried for a few minutes at a temperature around 35-40° C. The cured test sheets were then put into the desiccator over calcium chloride and allowed to remain for approximately 20 hours.

The dumb-bell pieces were stamped out and prepared in the usual manner for the Scott machine, after which they were returned to the desiccator until they were tested.

FIRESTONE FORMULA

	Grams	Per Cent
Rubber	470.3	94.06
Zinc oxide	12.5	2.5
D. O. T. G.	2.2	0.44
Sulphur	15.0	3.0
	500.0	100.00

Note 1. The mill on which this was carried out was the ordinary laboratory 30.5 × 15.2 mm. (12 × 6 inches) type. The front roll makes 29 revolutions and the back roll 37 per minute without load.

Note 2. It will be obvious that the time of heating and the time

[1] Presented by the Division of Rubber Chemistry at the 76th Meeting of the American Chemical Society, Swampscott, Mass., September 10 to 14, 1928. Publication permitted by *Ind. Eng. Chem.* Analytical Edition, Jan. 15, 1929.

MAXIMA AND MINIMA

(Five laboratories; seven tests; Firestone formula)

	Maxima	Minima
45-Minute Cure		
Tensile at 700 per cent elongation	124	72.3
Tensile at break	229	174
Per cent stretch at break	850	775
60-Minute Cure		
Tensile at 700 per cent elongation	169	108
Tensile at break	238	197
Per cent stretch at break	823	737
75-Minute Cure*		
Tensile at 700 per cent elongation	191	135
Tensile at break	265	204
Per cent stretch at break	781	696
90-Minute Cure		
Tensile at 700 per cent elongation	218	152
Tensile at break	269	214
Per cent stretch at break	784	703

*Thermatomic Test No. 1, 75-minute cure omitted.

SUMMARY OF TESTS USING GOODRICH RUBBER AND RUBBER-SULPHUR FORMULA

	Firestone	Simplex	Thermatomic
Curing temperature	141° C.	141° C.	141° C.
Testing temperature	26.1° C.	22.2° C.	26.4° C.
150-Minute Cure			
Tensile at 500 per cent elongation	15.6	12.7	14.5
Tensile at 800 per cent elongation	54.5	52.3	61.2
Tensile at break	128	142	141
Per cent stretch at break	947	963	955
180-Minute Cure			
Tensile at 500 per cent elongation	16.9	20	16.9
Tensile at 800 per cent elongation	71.8	70	76
Tensile at break	135	142	181
Per cent stretch at break	906	915	927
210-Minute Cure			
Tensile at 500 per cent elongation	18.6	22.9	18.4
Tensile at 800 per cent elongation	83	81	89.4
Tensile at break	151	131	163
Per cent stretch at break	894	878	895

SUMMARY OF TESTS USING GOODRICH RUBBER AND FIRESTONE FORMULA

(Curing temperature, 137.4-137.7° C.)

	Goodrich	Simplex	Simmons	Firestone Run I	Firestone Run II	Thermatomic Run I	Thermatomic Run II	Remarks
45-Minute Cure								
Tensile* at 700 per cent elongation	119	112	108	80	123	72.5	100	Goodrich testing temperature 23.3° C.
Tensile* at break	215	206	213	174	192	189	229	
Per cent stretch at break	798	791	803	838	775	850	830	Simplex testing temperature 22.2° C.
60-Minute Cure								
Tensile at 700 per cent elongation	155	151	141	112	169	108	122	Simmons testing temperature 23.3° C.
Tensile at break	233	229	238	197	209	238	223	
Per cent stretch at break	783	775	790	790	737	823	806	Thermatomic, Run I, testing temperature 26.7° C.
75-Minute Cure								
Tensile at 700 per cent elongation	191	183	166	135	202	75†, ‡	171	Thermatomic, Run II, testing temperature 26.1° C.
Tensile at break	248	244	265	204	214	226†	255	
Per cent stretch at break	753	753	781	768	696	807†	756	Thermatomic, Run I, tested March 29, 1928
90-Minute Cure								
Tensile at 700 per cent elongation	218	209	190	162	213	152	187	Thermatomic, Run II, tested June 22, 1928
Tensile at break	253	242	269	213	217	264	267	
Per cent stretch at break	727	723	755	740	703	784	760	

*Tensiles are expressed in kilograms per square centimeter.
†Obviously wrong, because it is inconsistent with other cures on same stock.
‡Error in transcribing. Correct figure is 117.

of cooling depend upon the construction of the interior of the rolls, the temperature of the cooling water, and other considerations. Under the conditions described above the rubber was smoothed out into a sheet at 99-100°C., as measured by wrapping four successive pieces of the rubber around a mercury thermometer. If the steam is allowed to escape in a small cloud from each roll, the experimental evidence is that the temperature of the rubber will be approximately the boiling point of water.

Note 3. At the time of the introduction of the sulphur and accelerator, the temperature of the rubber was found to be 71°C. During the mixing period the water was again allowed to run through the front roll for 1 minute and through the back roll continuously. Obviously, the temperature of the rubber will be affected by the temperature of the cooling water and the rate of flow. It was found that the rapid cutting of the rubber tended to lower the temperature slightly. The reading varied from 65° to 70° C.

Note 4. The curing temperature of 137.5°C was not chosen with malice of forethought. This represented the actual temperature in the curing mold when the thermometer belonging to the press registered 40 pounds (2.8 kg. per sq. cm.) pressure.

Rubber-Sulpher Formula. The rubber, cut in strips, was wrapped around the front roll, while steam was passing through both rolls as described for the Firestone formula. At the end of five minutes the rolls were tightened slowly and a sheet was formed around the front roll. The total warming period was seven minutes. The rolls were then backed slowly until a continuous sheet of rubber was formed and the bank had become about 25 mm. in diameter. The sulphur was milled in and the sheet cut rapidly back and forth for five minutes, the steam having been cut off the back roll in the meantime. The rolls were then tightened until a sheet of the desired thickness was formed, after which the batch was cut off the mill in the usual manner.

RUBBER-SULPHUR FORMULA

Rubber	92.5
Sulphur	7.5
	100.0

The conditioning, curing, and testing were carried out according to the procedure described for the Firestone formula.

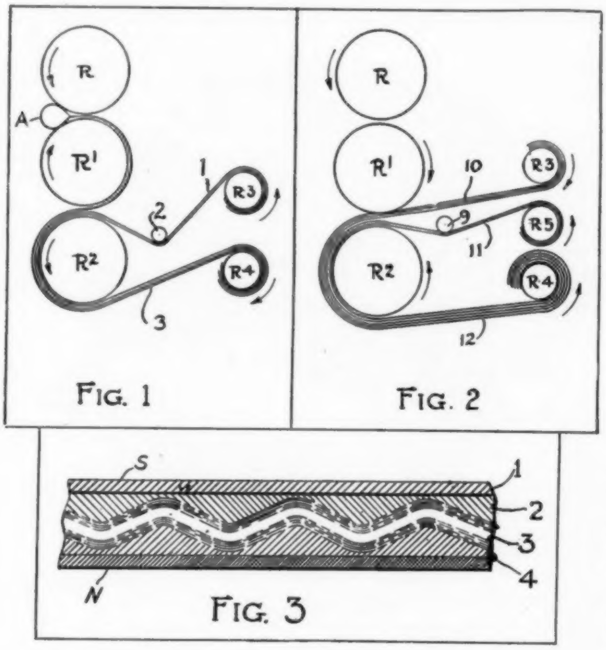
When Silk Resembles Rubber

In one dispersoid experiment which, with others, convinced the investigators that "the aggregate-fluid-crystal state is a universal condition of matter," P. P. vonVeimarn and aides found a curious rubber-like state of matter while making a microscopic study of silk coagula in natural and polarized light. Silk was obtained in the "aggregate-fluid-crystal state" by pouring a strong solution of natural silk in concentrated aqueous solution of a "substance dispergator" into a solution of a "substance aggregator." Photomicrographs of the resulting structures taken between crossed nicol prisms are held to prove that such silk solutions pass through a transition state in which they have the elastic properties of rubber. Examination in polarized light is said to indicate that the system then consists of fibrils in the form of spirals imbedded in a very viscous liquid. On drawing out a thread the spirals stretch out into parallel threads which curl into spirals again on being released. A similar system of spirals in a viscous liquid is assumed for rubber and all substances having an elastic consistency.—Repts. Imp. Ind. Research Inst., Osaka, Japan, 8, 67-80, 1927.

Imitation Leather

A Product Comprising Textile Fabric and Rubber

THE fields for artificial or imitation leather are varied and important. One of the largest is its use for automobile topping and automobile deck covering. The process of manufacturing a special variety of imitation leather for such purposes is described in a recent patent.[1]



Process of Manufacturing Imitation Leather

Imitation leather on a fabric base can be made possessing a very smooth shiny surface resembling the familiar varnished surface of patent leather. Passing the material over embossing or graining rolls, a product may be obtained carrying a raised surface grained in imitation of grain leather. By employing several different rubber compositions specially adapted for the various external and internal coating involved, plied up finished products can be made.

The construction of these products is effected by means of the calendering operations indicated in Figures 1 and 2, in the accompanying illustration. Figure 1 represents a 3-roll calender R, R^1 and R^2, in which a compound A is skim coated onto a frictioned cloth 1 entering the calender from roll R^3 under a tension idler roll 2, the coated fabric 3 being wound up at R^4.

In Figure 2 the operation is indicated of calendering together the last mentioned frictioned and skim coated fabric. A sheet or liner of polished thin flexible metal enters the calender from R^5. The combined coated fabric and sheet metal is rolled on R^4. This combination may then be tightly wrapped upon a cylindrical drum to the extent of several hundred yards in one continuous length. Its edges are then securely wrapped with curing aprons to protect the goods from injury by steam during vulcanization. Curing is effected in an ordinary open steam vulcanizer or by any other well-known method of heat vulcanization.

Removal of the metallic liner after vulcanization, leaves the rubber surfaced fabric with a polished surface or an imitation grain leather surface according to the surface of the metal liner. The addition of another calendered coating of special rubber composition containing cotton linters can be applied before the doubling preceding vulcanization. This composition supplies a surface which when buffed by sandpaper confers the aspect of suede leather. In this way the product may show a tough polished or grained leather effect on one side and on the opposite side a velvety leather effect suitable as a lining.

A section of such a plied up rubber and textile product is pictured in Figure 3 in which the constituent parts are indicated as follows: A textile fabric 3, calendered upon one side with a plastic composition 2 which is doubled upon another plastic composition 1. The textile fabric 3 is also calendered upon its opposite side with a plastic composition 4 containing fibers. After buffing a nap N is raised over the surface of this compound. Inasmuch as the composition 1 is originally laid upon a metallic liner the surface effects of the liner are transferred to the composition 1 to produce an imitation patent leather surface S. In case the liner is embossed a similar effect is produced on the surface S.

This fabric is especially attractive and useful for automobile topping and for many other purposes where a leather substitute is desired.

[1] U. S. Patent No. 1,694,258.

Rubber Division A.C.S.

New York Group

WLLIAM B. WIEGAND, chairman of the New York Rubber Group, A. C. S. has completed plans for broadening the scope of this organization. The first step has been to appoint the following advisory committee:

GROUP ACTIVITIES COMMITTEE to act on general business, on meetings and on social matters: S. M. Caldwell, Chairman, D. F. Cranor, F. C. Batchelor, William Whitcomb.

TECHNICAL COMMITTEE to act on subject and presentation of papers and technical matters generally: E. H. Grafton, Chairman, W. A. Gibbons, W. L. Sturtevant, Stanley Krall.

The following procedure and policy for the coming year was outlined: (1) Effort to be made to increase the sociability among the members by having the Group Activities Committee act as a welcoming committee. (2) Meetings interspersed with songs and music. (3) At each meeting members to be provided with a badge on which his name and business connection could be written.

A group party of entirely social nature is also being considered.

The proposed type of meeting would be different from the usual lecture type, and consist of short papers on some pertinent subject, followed by a discussion. This would be in the nature of a symposium.

The subjects suggested for future meetings are: (1) Stearic Acid. (2) Performance or Service Tests. (3) Temperature of Cure as Related to Compound structure. (4) Shelf Aging versus Artificial Aging.

The Group Chairman proposes general group research which could be made supplementary to the work of the Physical Testing Committee of the Rubber Division. This would consist in making tests in a number of the laboratories of this group according to the recommended procedure with uniform materials. The results would be studied statistically to determine the limits and errors of the recommended procedure and the report made a subject for one meeting and published as a contribution of the New York Rubber Group.

The first meeting of 1929 will be held at the Town Hall Club, 123 West 43d Street, New York, N. Y., at 6.30 P.M.,

Wednesday, March 20. There will be a series of short, crisp, practical papers on stearic acid as a rubber compounding ingredient. W. F. Russell, Norwalk Tire & Rubber Co., will sketch the early history of stearic acid as a compounding ingredient, and the following experts will discuss its proper use in reclaimed rubber, tires, footwear insulated wire and latex: H. A. Winkelmann, Philadelphia Rubber Reclaiming Works; E. W. Fuller, Fisk Rubber Co., Donald F. Cranor, Binney & Smith; L. D. Ackerman, Converse Rubber Shoe Co.; Charles R. Boggs, Simplex Wire & Cable Co.; J. B. Crockett, Vultex Corporation of America.

Dinner reservations at $2 each should be made promptly with the secretary, W. H. Cope, R. T. Vanderbilt Co., 50 East 42d Street, New York, N. Y.

Testing Electric Power Cable Insulation

Insulation Tests With Megohmer Give Valuable Information

THE following account of a survey in a large mechanical rubber goods plant illustrates an item of modern electrical practice considered essential to check the continuous reliability of the insulation of the cable supplying power for plant operation.

Electric power is brought into the plant and distributed to six substations at 2,300 volts through an underground conduit system. Nine motors are operated directly from the 2,300-volt primary circuits and both lines and motors are tested for insulation resistance about three times a year. This testing gives the operating department ample advance notice wherever insulation shows signs of deteriorating. The system of connections is such that an insulation failure at any of the substations, or in any one of the nine motors, would shut down all equipment in a considerable section of the plant.

Six of the nine primary-circuit motors are set in pits below ground level. One of these has been flooded on three different occasions due to failure of overhead water pipes and has been restored to service only after careful bake-out. The special testing instrument described below has played an important part in checking the bake-out on each of these occasions, its use having made it possible to return the motor to service promptly upon the restoration of proper insulation resistance and thereby avoided both premature starting, with danger of later failure, and excessive bake-out involving undue loss of productive time. This particular motor was urgently needed but the operating department states that the bake-out would probably have been prolonged four to five hours in each case as an added marginal safety, had this instrument not been available.

Trouble recently developed in a 4-cable conduit, but it was possible to determine quickly which of the 4 cables was causing this trouble and to find out, also, if any of the others had been seriously affected by it. These tests not only showed which cable had actually failed but indicated that a second was in poor condition. The removal and replacement of two cables was made more quickly and at less expense than would otherwise have been possible and testing has since been applied regularly wherever it appeared that cable insulation might be in poor condition.

The instrument employed for these tests is the Sticht 2-in-1 Megohmer. This self-contained and easily portable instrument shown in the accompanying illustration is designed to give accurate measurements of insulation resistance on electrical circuits and equipment of all kinds. A hand-operated D. C. generator is built into its case and the testing operator has merely to turn this generator crank at the proper speed and then read insulation resistance directly from either ohm or megohm scale.

The instrument gives reliable results on resistance from 0 to 5,000 ohms on its low-range scale and can also be applied on resistance up to 200 megohms by a simple change of its connections. It is primarily intended for the measurement of resistance in the manner outlined but may be used either as an A. C. or D. C. voltmeter.

Sticht 2-in-1 Megohmer

The data in this article was abstracted from a survey made by A. C. Nielsen Co., in collaboration with A. W. Vennema, superintendent of the Manhattan Rubber Manufacturing Co., Passaic, N. J.

Sumatra Native Growers Organize

Native rubber planters in Sumatra, whose great increase in planted acreage has caused much anxiety in hitherto restricted British areas, are adjusting themselves in a businesslike manner to the new conditions in the rubber market. It is reported that in Djambi Province native schools have been organized, in which demonstrations in skillful tapping and the most approved culture of rubber trees is given by experts. Also, a cooperative movement has been started with the object of establishing milling factories owned by native rubber producers, and thereby eliminating middlemen. These activities indicate that the natives are giving serious consideration to their economic problems. It also follows that native growers have no intention of almost giving rubber away, as many had feared would follow the removal of restriction. In other words, the natives are getting market-wise.

Mica Compound for Aprons

Mica, long valued as a rubber compounding ingredient especially for products used in electrical insulating and in packings exposed to hot water, is finding increasing use in a rubber proofing mixture for rubberized aprons for kitchen and laboratory needs. It is ground to a flour and the mix can be sheeted extremely thin. The surfacing thus given to fine or coarse fabrics is remarkably resistant to common or strong chemical stains.

Uniting Rubber to Metal

JOSEPH ROSSMAN

The Attachment of Rubber to Metal is Required in the Manufacture of Many Industrial Products. Among Which Rubber Covered Electric Wire, Rubber Lined Tanks and Rubber Covered Rolls are the Most Important.

THE following abstracts afford a review of the processes for uniting rubber to metal as disclosed in the United States patents. This concludes the article that appeared in the INDIA RUBBER WORLD, February 1, 1929.

1. Hingher, 106,585. Aug. 23, 1870. This relates to improvements in covering buckles and other metal articles with rubber, and consists in the employment of varnish, soap or other substances which will expand under the action of heat between the surface of the metal article to be coated and the coating of rubber, for preventing the coating from shrinking away from the walls of the vulcanizing mold. This shrinkage damages the coating of the article which becomes rough and requires considerable finishing after removal, and is often wholly ruined.

2. Rowley, 133,259. Nov. 19, 1872. The invention is designed for use upon ornamental castings, such as escutcheons, keyhole guards, bolt-keepers, etc., but is equally applicable to any article in which it is desired to produce a plane or uniform surface by filling or inlaying all depressions or interstices. The article is heated to about 175°F., a thin sheet of rubber placed upon the side which is to be inlaid, and the whole subjected to heavy pressure within a press causing the rubber to fill each depression, after which the article is vulcanized. It is then placed upon an abrading surface and the surplus rubber above the metal removed. A beautiful contrast now exists between the polished metal and the filling, the latter serving to bring out and render more distinct the outlines of the former

3. Beardmore, 214,083. Apr. 8, 1879. Packing is made by placing wire gauze between two sheets of rubber, and rolling them together forming a solid homogeneous body.

4. Adams, 215,034. May 6, 1879. Covering metallic articles with rubber by first coating the metallic articles with a thin film of copper or other metal which readily unites with sulphur, and then applying the rubber and vulcanizing it.

5. Daly, 233,144. Oct. 12, 1880. The method of making dental vulcanite plates with metallic surfaces consists in coating the mold with metal by electrodeposition and then vulcanizing the rubber plate on the metal.

6. Mayall, 247,841. Oct. 4, 1881. Affixing rubber to metal consists in giving the metal one or more coatings of a solution of rubber and sulphide of antimony, and then applying the rubber and vulcanizing it.

7. Garrity, 251,866. Jan. 3, 1882. Coating metallic articles with a rubber consists in first coating the metallic article with muriate of tin, then applying a layer of a composition formed of litharge, sulphur and rubber cement, which will unite with the muriate of tin at the vulcanizing heat, and finally applying the rubber compound and vulcanizing it.

8. Richardson, 259,721. June 20, 1882. The metal surface is prepared by removing all oxidation, scale or impurities, then the clean surface is covered with liquid rubber, next a thin sheet of soft rubber is applied by pressure and heat, then the rubber is cemented to this thin sheet and the whole vulcanized.

9. Baumgarten, 263,462. Aug. 29, 1882. An umbrella stick is covered with vulcanite by pressing upon the stick two bands or strips of rubber and then vulcanizing it.

10. Avery, 264,121. Sept. 12, 1882. Metallic articles are coated with vulcanized rubber by first cleansing the metal surface, then applying one or more coats of rubber cement composed of para rubber, oxide of zinc, sulphur and naphtha, and finally applying the rubber compound and vulcanizing it.

11. Mayall, 286,035. Oct. 2, 1883. First cover the wire to be insulated with a coating of plastic compound of rubber and graphite, without sulphur, and then place over this a layer of rubber, graphite and sulphur, vulcanized before applying it, and completely uniting it with the inner covering of rubber and graphite by cement and pressure. Thus the wire is only in contact with the rubber and graphite compound, which is a perfect insulator, and has no tendency to corrode the wire. The outer coating of rubber, graphite and sulphur, vulcanized, protects the inner unvulcanized coating from the atmosphere and moisture and also strengthens the insulation and renders the wire less liable to injury.

12. Smith and Smith, 317,587. May 12, 1885. Insulating covering of electrical conductors are vulcanized by enveloping the covered wire in a tight and impervious cover of tin foil or other pliable metal, and subjecting it to the combined and simultaneous action of heat and pressure.

13. Wood, 325,469. Sept. 1, 1885. The process of uniting gold and caoutchouc consists in coating the caoutchouc with chloride of silver, laying on the gold, and vulcanizing the mass.

14. Barnes, 348,183. Aug. 31, 1886. The method of lining plates of plastic material with gold, platinum, consisting in first preparing the gold, platinum, etc., by tinning one of its surface with cement; second, preparing a plastic base by attaching thereto a layer of vulcanizable gutta percha; and third, uniting the plastic base and metallic lining by pressure and heat.

15. Emerson and Midgley, 386,305. July 17, 1888. Manufacturing belting which consists in forming a metallic body by intersecting coiled sections of wire and elongating the links by passing it between rolls, then coating the surface of the body with rubber or its equivalent, and finally passing the whole between heated metallic bodies, forcing the rubber into the interstices of the body and forming a compound or metallic and plastic surface.

16. Southard and Klauser, 420,609. Feb. 4, 1890. Rubber tired wheels are made by molding unvulcanized rubber upon a metal rim or tire provided with inwardly-pro-

jecting flanges adapted to retain the rubber, and then vulcanizing the rubber tire in place.

17. Southard and Klauser, 420,610. Feb. 4, 1890. Rubber tired wheels are made by molding unvulcanized rubber upon a metal rim or tire provided with inwardly-projecting flanges adapted to retain the rubber, the recess formed by the flanges being provided with a tape of suitable material adapted to give rigidity to that part of the rubber tire within such recess, and then vulcanizing the rubber tire in place.

18. Lambert, 452,479. May 19, 1891. The method of manufacturing articles of hard rubber and metal, consisting in vulcanizing the rubber portion, then subjecting the article to the action of heat, then cooling it, and finishing the rubber portion.

19. Newbury, 652,975. July 3, 1900. A conductor or other article is covered with rubber by wrapping it longitudinally about the article with the edges abutting and projecting, inserting a cylindrical piece of rubber at the seam parallel with the edges and trimming off the projecting edges and compressing the edges and a piece of rubber to form the seam by running the article with the rubber wrapping and the piece of rubber between compression and cutting rollers.

20. Dover, 699,458. May 6, 1902. Making an electric cable formed of a plurality of wires or strands or wires and strands embedded or inclosed in celluloid, xylonite or similar material by forcing the material under pressure through a die and around and between the wires or strands passing through the die and at same time imparting a twist to the cable thus formed so as, at a single operation, to form a cable wherein the individual wires and strands are insulated from each other and are twisted about the central wire or strand.

21. Sheehan, 839,214. Dec. 25, 1906. A blanket for lithographic and other presses, comprising a rubber or other resilient body, a wire passed across the body from side to side at intervals and a supplemental wire passed across the body from end to end at intervals, the turns of the last-named wire extending beyond the body and forming attaching loops.

22. Weida and Hardy, 844,070. Feb. 12, 1907. A chemical receptacle having its walls formed of a sheet of perforated metal and an interior and exterior layer of hard rubber compound forced into the perforations of the metal and the whole vulcanized.

23. Marks, 844,822. Feb. 19, 1907. A rubber tire having a plurality of solid layers of metallic fabric or the like embedded therein, is formed by placing one or more layers of metal fabric in a mold with rubber compound, forcing it by pressure into the interstices of the fabric and forming the tread and upper portion of the base. The lower portion of the base is formed by forcing rubber compound into the interstices of a sheet of metal fabric and wrapping the fabric and rubber around a suitable form to form a plurality of layers, then placing the tread and upper portion of the base upon the lower portion of the base, and joining the ends, then subjecting it to pressure and finally vulcanizing.

24. Giles, 850,747. April 16, 1907. The process of manufacturing rubber tired wheels, consisting of performing the complete operation of molding the rubber tire directly on the rim of the wheel, then vulcanizing the tire to varying degrees of hardness, its hardest portion being immediately adjacent to the rim.

25. Gautier, 978,731. Dec. 13, 1910. A strengthening sheet for pneumatic tires comprising flat metallic chains embedded in a flexible protecting material, a strip or rubber wound in a spiral around each layer of flexible material, the chains being disposed in cross rows and embedded in layers of rubber.

26. Underwood, 1,012,030. Dec. 19, 1911. An improved plastic fabric consisting in a plastic material having a plurality of series of spun metallic yarns incorporated therein in regular arrangement, the yarns in one series being arranged transversely of the yarns in another series.

27. Daft, 1,057,333. Mar. 25, 1913. The method of attaching rubber to metals which consists in electroplating the article in an electrolyte made from a plurality of metals one of which is arsenic, obtaining a deposit containing arsenic, and attaching the rubber to the surface thus formed, by vulcanization.

28. Daft, 1,057,334. Mar. 25, 1913. The process of attaching rubber to metals which consists in electroplating the article in an electrolyte made from a cast alloy containing bismuth, arsenic, copper and zinc, obtaining a deposit of the alloy and vulcanizing the rubber directly upon the surface thus prepared.

29. Daft, 1,120,794. Dec. 15, 1914. The method of attaching rubber to metals which consists in depositing an antimony alloy upon the surface of the metal, bringing rubber containing a vulcanizing agent into engagement with the surface thus treated, and vulcanizing upon the surface.

30. Daft, 1,120,795. Dec. 15, 1914. The art of attaching rubber to metals which consists in bringing rubber containing a vulcanizing agent into engagement with an article having a non-stannous surface of an alloy of bismuth, copper and zinc, and vulcanizing the rubber upon the surface.

31. Daft, 1,124,302. Jan. 12, 1915. Attaching rubber to metals which consists in bringing rubber containing a vulcanizing agent into engagement with the surface of a non-stannous alloy of antimony, copper and zinc, and vulcanizing the rubber upon the surface of the alloy.

32. Crane, 1,152,935. Sept. 7, 1915. A compound composed of resilient vulcanized rubber and steel wool is produced by first mixing rubber and steel wool in the usual manner, and then subjecting the compound to a force moving the fibers of the steel wool to substantially longitudinal parallelism to each other, and finally vulcanizing the compound with the fibers of the steel wool.

33. Gammeter and Allen, 1,183,551. May 16, 1916. Solid rubber tires are formed by winding a sheet of rubber compound upon a metal rim until a laminated base has been built up from successive windings, and then superposing a second sheet of rubber compound that it will become less hard under vulcanization, and winding this second sheet until a laminated tread has been built up on the base, and vulcanizing the tire thus formed directly upon the annulus.

34. Hoerbelt, 1,211,706. Jan. 9, 1917. Making blankets for offset printing presses which consists in stretching a thin sheet or film of rubber or other stretchable material and cementing it to one of the faces of a sheet of non-stretchable non-yielding material and in applying a sheet of yielding material to the other face of the sheet of non-stretchable non-yielding material.

35. Kennington, 1,218,568. Mar. 6, 1917. Insulating an article by placing separately in a mold a distinct body of rubber having metallic contacts embedded therein and together adapted to form a contact surface, and a distinct mass of phenolic condensation product, and then subjecting the mold to heat, to mold and harden the condensation product into close association with the rubber and the metallic contacts.

36. Conklin, 1,218,596. Mar. 6, 1917. The method of forming an insulating distributer for electrical current distributing purposes consists in placing a piece of plastic rubber against a solid body of phenolic condensation product preshaped as the body of the distributer, then while pressing the rubber against the distributer body, subjecting both to sufficient heat to vulcanize the rubber and contemporaneously to mold it into the distributer body.

37. Swartz, 1,237,227. Aug. 14, 1917. The process of making an expansible reinforced cushion tire consisting in molding a continuous comparatively hard non-yielding rubber base on a continuous metal rim engaging band, curing a comparatively soft rubber tread on the base, and forming transverse slits through and across the band and the base.

38. Brown, 1,250,959. Dec. 25, 1917. The art of forming an article consisting of a soft rubber part and a device to which it is difficult to secure soft rubber, comprising interposing a bond between them consisting of a body formed of a phenolic condensation product, and autogenously securing it to the rubber part, the bond being adapted to be readily secured to the device.

39. Stevens, 1,276,821. Aug. 27, 1918. Making solid tires by forming a base of hard rubber on a rim, extruding the cushion portion of the tire in approximately the cross section of the finished tire, cutting the cushion portion into a length sufficient to encircle the rim, placing the cushion portion on the rim and on the previously applied hard base.

40. Dickey, 1,330,791. Feb. 17, 1920. Producing rubber grips for tool handles consists in first applying a coating of soft rubber to the handle, then placing a former upon it to shape the rubber to the configuration of the tool handle, then wrapping the former with a fabric, then submitting the whole to a vulcanizing process, whereby the rubber will positively adhere to the metal of the tool handle, then removing the former from the handle, leaving a rubber grip of a uniform thickness relative to the tool handle throughout.

41. Boyer, 1,367,231. Feb. 1, 1921. The inner surfaces of a tank are lined with hard rubber by covering them with a layer of soft rubber while plastic, covering the layer of soft rubber while plastic with a layer of hard rubber, also in a plastic condition, applying steam under pressure to vulcanize the layers of hard rubber and the soft rubber being forced to adhere to the inner surfaces of the tank, and applying water under pressure after vulcanization to keep the rubber lining adhering to the tank while the lining and tank cool.

42. Goodenberger, 1,392,576. Oct. 4, 1921. Manufacturing solid tires comprising a metallic rim, the upper surface of which is provided with irregularities, a hard base and a tread portion, the step of laying strings transversely of the tires between the rim and the hard base and between the hard base and the tread portion, the strings leading from the interior of the tire to the exterior thereof and venting the spaces between the several parts of the tire.

43. Litchfield, 1,424,134. July 25, 1922. Building a solid tire on a rim having circumferential edge flanges consists in: (a) applying a thin layer of hard rubber compound to the rim; (b) forming a slab of different rubber compound of such thickness that the outer surface will be disposed beyond the outer edges of the rim flanges when the slab is applied on the hard rubber compound; (c) applying the slab on the layer of the hard rubber compound; (d) placing the rim so that the outer surface of the slab is in contact with the roll of a calender; and (e) simultaneously winding and pressing a calendered strip of rubber on the slab to form the tire tread.

44. Keith, 1,426,198. Aug. 15, 1922. A rubber heel is made by placing soft uncured rubber in a mold, pressing into the rubber a reinforcing plate which is of a less transverse dimension than the mold, and then vulcanizing the heel with the plate embedded therein.

45. Denmire, 1,435,218. Nov. 14, 1922. The process of manufacturing molded articles such as rubber heels, having conical metallic inserts embedded therein, comprising supporting the inserts within the mold cavity while in flattened condition, and then coning them while they are so supported.

46. Sheppard and Eberlin, 1,476,374. Dec. 4, 1923. Depositing rubber and coloring material, vulcanizing material and an accelerator of vulcanization onto an electroconducting surface of an object, which comprises bringing the surface into contact with an electroconducting rubber emulsion containing coloring material, vulcanizing material and an accelerator of vulcanization, and passing an effectively unidirectional depositing electric current through the surface and emulsion.

47. Burley, 1,500,546. July 8, 1924. Manufacturing rubber insulated electric wires having a plurality of layers of rubber insulation comprising the steps of applying a layer of rubber compound to the wire, semivulcanizing the layer, applying a second layer of rubber compound, with the wire in a rigidly confined space having substantially the same cross sectional area as the wire, heating it to vulcanizing temperature whereby both layers of rubbers are subjected to high pressure.

48. Blackwelder, 1,520,925. Dec. 30, 1924. A tire fabric comprising metallic strands, rubber applied to the strands, a fabric covering woven around the strands and layers of the rubber applied upon each side of the strands whereby a sheet fabric is formed.

49. Letts, 1,540,563. June 2, 1925. The method of providing a container with a non-corrosive lining which consists of affixing a perforated backing to the inner surface of the container in spaced relation thereto, thereafter pressing plastic rubber against the backing and thereby forcing a part of it through the perforations against the container while the remainder entirely overlays the backing to form a lining and then vulcanizing the rubber in place.

50. Merrill, 1,570,445. Jan. 19, 1926. Uniting metal and soft rubber by adding to a dispersion of rubber in a liquid sufficient sulphur to vulcanize the rubber to hard rubber and an accelerator of vulcanization in sufficient quantities to retard the migration of the sulphur during vulcanization, spreading the dispersion so prepared in a thin film upon the metal surface, superposing thereon a soft rubber composition, and subjecting the assembled structure to vulcanizing temperatures.

51. Weigel, 1,577,050. Mar. 16, 1926. A fabric for pneumatic tire casings consisting solely of vulcanizable rubber sheets, independent flexible metallic wire strands embedded in the rubber and each strand being separated from adjacent strands by the rubber, the wire strands being disposed sufficiently close together to so divide the rubber that the latter in conjunction with the wire strands can together of themselves resist air pressure after the fabric sheet is formed into a casing.

52. Withycombe, 1,581,823. Apr. 20, 1926. The process of uniting rubber and metal which consists in treating the surface of the metal with a paint containing substances having the equivalent functions of raw rubber, sulphur, charcoal and sodium chloride, placing vulcanizable rubber against the surface so treated and subjecting the whole to vulcanizing temperature until the rubber is vulcanized.

53. Avery, 1,587,742. June 8, 1926. The production of rubber coated metal sheets, consists in providing a galvanized sheet, plating it with an alloy containing a substantial percentage of copper and vulcanizing a layer of rubber directly thereto.

54. Beal and Eberlin, 1,589,324. June 15, 1926. The method of depositing rubber on an electroconducting surface of an object comprises covering the surface with zinc, bringing the covered surface into contact with an aqueous electroconducting rubber emulsion and passing a depositing electric current through the surface, zinc covering and emulsion.

55. Sheppard and Beal, 1,589,326. June 15, 1926. The process of depositing rubber on an electroconducting surface of an object comprises covering the surface with a coherent organic potential-equalizing substratum through which the depositing current can pass, bringing the sub-

stratumed surface into contact with an aqueous electroconducting rubber emulsion and passing a depositing electric current through the surface, substratum and emulsion.

56. Sheppard and Eberlin, 1,589,329. June 15, 1926. The method of continuously coating metal wire comprises passing it continuously through an apparatus wherein a vulcanizable rubber composition is electrodeposited thereon, then through a drier wherein it is partially dried, then between rolls so shaped and spaced as to compact the coating uniformly and reduce it to definite predetermined size, then through another drier and then through a vulcanizer.

57. Villiers, 1,602,870. Oct. 12, 1926. A lining comprising two adherent sheets of rubber, and a mesh of strands disposed between the sheets and united together with the sheets, each strand comprising a plurality of high-tensile steel wires twisted together.

58. Geer, 1,617,588. Feb. 15, 1927. The method of bonding rubber to metal comprises applying to the metal one or more coatings or films of a tacky, heat-plastic bonding substance composed at least in substantial part of a rubber isomer having a less chemical unsaturation than rubber, applying thereto a curable rubber composition, and vulcanizing the rubber while in contact therewith.

59. Alderfer, 1,633,620. June 28, 1927. A plurality of separate wires are divided into groups and passed through a die where a mass of rubber is forced about the wires while they are spaced apart. The wires are reduced to a flat tape which is then cooled and wound on a drum to form a bead.

60. Burley, 1,674,156. June 19, 1928. Manufacturing insulated electric wires or cables which comprises the steps of applying a layer of rubber compound to the conductor. applying a layer of fibrous material, semivulcanizing the layer, applying a second layer of rubber compound, and vulcanizing the rubber under pressure between heated plates.

61. Merrill, 1,677,360. July 17, 1928. The art of making composite products of vulcanized rubber and a metal which combines with sulphur at vulcanization temperature to form a metallic sulphide, comprises coating the metal with a tough, tacky, heat-plastic rubber isomer, superposing thereon a sulphur-containing rubber composition with an intervening barrier layer of a composition capable of inhibiting migration of sulphur there through from the sulphur-containing rubber composition to the metal, and subjecting the assembled product to vulcanization temperatures.

62. Anderegg, 1,681,566. Aug. 21, 1928. The method of applying a relatively fluid compound and a covering material to a conductor in a continuous operation, which consists in passing the conductor through a relatively fluid compound subjected to pressure, drawing the compound covered conductor through a covering material, and adjusting the pressure of the compound to neutralize the pressure exerted from the application of the covering material.

Hudson River Bridge

Concrete Construction Speeded by Rubber Conveyor Belting

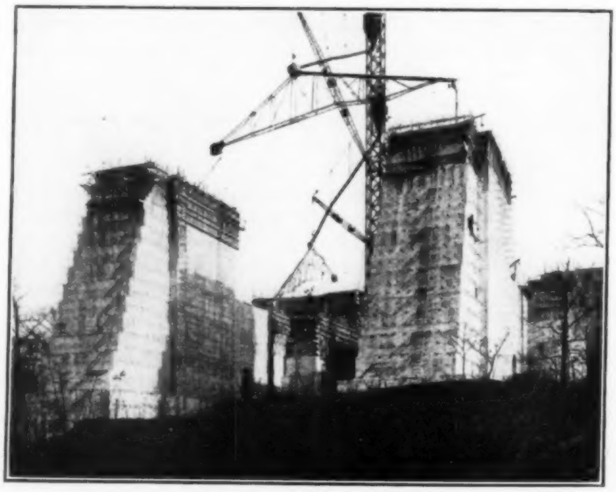
THE Hudson River bridge now being constructed above the Fort Lee Ferry, New York, will be the world's largest suspension bridge when completed in 1932.

The four great cables which will carry the bridge are approximately 36 inches in diameter, and by far the largest ever built. They are supported on the New Jersey side by being fastened to the Palisades through tunnels blasted through the trap rock. In order to fasten the 28,000 ton strands of the supporting cable on the New York side, it was necessary to cast a block on concrete—the largest mass of concrete thus far ever assembled.

The great anchorage, being approximately 1,000 feet back from the Hudson River, the New York Central Railroad, and close to Riverside Drive presented problems in construction. The engineers were confronted with the task of assembling and mixing the raw materials for this gigantic cliff, without blocking Riverside Drive, one of New York's main traffic arteries, for nearly a year.

Capt. B. M. Mitchell, of Passaic, president of the Conveying Weigher Co. and consulting engineer for The Manhattan Rubber Manufacturing Co. devised the plan of building a dock at the Hudson River, close to the Washington Point Lighthouse. The raw materials were brought to this point in barges and removed by cranes and derricks and placed near a temporary tunnel on the dock. The sand and gravel were then loaded on a belt conveyor installed in the tunnel, which in turn fed on to two other conveyors leading into the mixing station building. The bags of cement were unloaded from barges on to another conveyor which runs parallel and beneath the gravel conveyor—both unloading into the same mixing shed. From this shed, the sand, gravel and cement were fed to two mixers, so that there was a constant feed of mixed concrete being discharged at the rate of two tons per minute—or 120 tons an hour. From the mixers, the concrete was passed along to a conveyor running to the center of the anchorage and in to buckets holding four tons of mixed concrete. These buckets were then raised to a great tower and fed into the forms through chutes which could be raised, lowered and discharged through an entire circle.

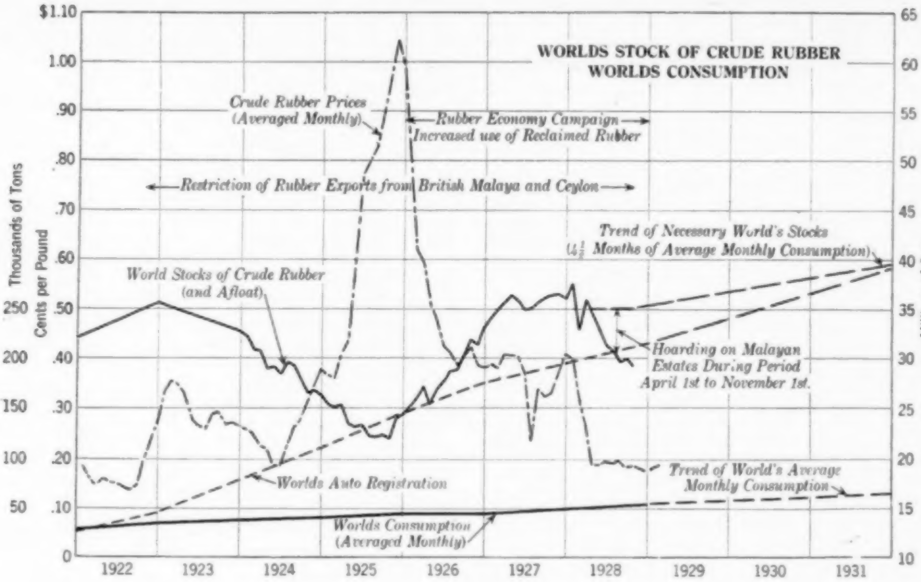
The photographs shows the majority of the great mass of concrete as it appeared on December 31, 1928. At that time,



New York Anchorage Hudson River Bridge, Dec. 31, 1928

approximately 182,000 tons of concrete had been placed. It is of striking significance that this entire mass had been delivered since September 4, 1928, with a single 22 inch conveyor belt. The belt is still in use, and after the entire 214,000 tons of concrete have been placed, the belt will be taken up and used for another job.

The Conveying Weigher Co. designed and built the conveying system and the belts were made by The Manhattan Rubber Manufacturing Co.



1929 Bright Rubber Prospects

Plantations Must Work at Capacity to Maintain Necessary Crude Rubber Surplus

CLIFFORD C. JOHNSTON

IT was inevitable that in a nation of motorists consuming about two-thirds of the rubber produced in the world there should arise a public interest in the commodity similar to the speculative interest which has been prevalent in Great Britain for many years. It was not, however, until the Stevenson Act was enacted that rubber items were considered as news by the American press. The formation of the New York Rubber Exchange fortunately moderated the radical fluctuations in prices that came as a result of the Stevenson enactment. Price fluctuations on the Exchange indicate, however, that close students of the changing conditions relative to the production and consumption of crude rubber are no longer confined to the rubber trading fraternity, with the result that more attention is being given by the latter to rubber statistics than was customary in the past. It is the purpose of the writer in the following article to touch on the salient factors governing the future prices of the commodity.

The figures in Tables 1 and 2 have been taken from the United States census reports when available and from the reports of the Rubber Association of America in other than census years, their percentages of completeness being estimated by the United States Department of Commerce by interpolation. It is apparent from these figures that the relative amount of crude rubber used in tire compounds was steadily reduced during the restriction years 1922 to 1928. That the reduction of over 10 per cent in the use of crude rubber in casings has been possible only because of the availability of superior grades of reclaims, is shown in the following figures giving the annual consumption of reclaims and the ratio of reclaimed consumption to crude rubber consumption. The reclaimed-crude ratio evidently reached its peak in 1927 when the tonnage of reclaimed consumed equalled one-half of the crude consumed.

Year	Consumption of Reclaims	% Reclaims to Crude
1919	73,535	36.3
1920	75,295	38.4
1921	41,351	24.1
1922	54,458	19.3
1923	69,534	22.7
1924	76,072	22.4
1925	137,105	35.6
1926	164,500	45.9
1927	189,500	50.8
1928	200,448 (preliminary)	46.0

An analysis of the monthly percentages of reclaimed consumption to crude rubber consumption during 1927 and 1928 further indicates that the use of reclaims was proportionately lessened during the closing months of 1928.

Much is being said in automobile circles of the tremendous replacement demand that can be expected during ensuing years. In the analysis of the distribution of casings and tubes for the past seven years, shown in Table 2 the

TABLE 1

CRUDE RUBBER IN CASINGS AND TUBES

Year	000 Omitted †Production		Per Cent Increase		Tons *Crude Rubber In		Crude Rubber Lbs. Per		Tons Crude Rubber In		Per Cent Crude Rubber In		
	Casings	Tubes	Casings	Tubes	Casings	Tubes	Casing	Tube	Sundries and Repair Material	*Total All Products	Casings	Tubes	Total Casings and Tubes
1922	40,000	47,780	47	49	185,700	42,000	10.4	2.0	2,542	282,400	66	15	81
1923	45,400	57,229	13	20	197,500	45,000	9.6	1.8	2,564	305,500	65	15	80
1924	51,500	66,700	11	17	221,200	55,100	9.6	1.9	3,231	335,300	66	16	82
1925	59,800	77,388	16	16	256,000	64,400	9.5	1.9	4,730	387,600	66	17	83
1926	60,500	74,300	17	—4	246,800	55,200	9.1	1.7	5,180	359,600	69	15	84
1927	63,900	70,855	6	—5	253,200	50,500	8.9	1.6	5,660	364,000	70	14	84
1928	78,500	80,000	23	13	308,000 (preliminary)	62,000	8.8	1.7	6,200	440,000	70	14	84

*U. S. Census figures of the amount of crude rubber consumed are available only for 1925 and 1927. From these figures it has been assumed that the R. A. A. quarterly reports for 1926 are 91.7 per cent complete. The years, 1925 and 1927 are 91.3 per cent and 94.1 per cent complete based on census figures. For 1922, 1923 and 1924 the R. A. A. assumption that the quarterly consumption figures are 90 per cent complete has been accepted in the absence of other official figures. Figures for 1928 are based on R. A. A. quarterly reports available, being 92 per cent complete (4th quarter estimated).

†From the U. S. Census returns for 1921, 1923, 1925 and 1927, the Rubber Division of the Dept. of Com. estimates that R. A. A. casing and tubes reports are complete only for the following percentages, which were used in the above tabulation.

Year	Casings	Tubes	Year	Casings	Tubes
1921	80.1	84.6	1925	77.8	80.2
1922	77.0	80.1	1926	77.0	77.4
1923	75.1	79.0	1927	76.4	74.4
1924	76.6	79.6			

NOTE: For 1928 the R. A. A. assumption that their figures are 75 per cent complete has been taken as correct in the absence of other official estimates. (Casing figures include solid and cushion tires.)

figures indicate that during the six years of the Stevenson enactment the production of casings and tubes for old cars in use steadily decreased, except in the instance of 1928, when a marked increase took place.

With rubber contents per casing and tube and number of replacements per car steadily decreasing, and the Stevenson restrictions removed, there were definite grounds for expecting a superabundance of rubber during 1929, and it was generally predicted (until the 1928 figures were known) that world's production would be likely to very much exceed world's consumption. Since the latter part of 1928, however, the production and consumption estimates of market prognosticators have taken on a more conservative tone and the largest estimate of world's production given any prominence has not exceeded 720,000 tons. This figure would seem to be almost the productive capacity for 1929 based on the following official estimates of total acreages of plantation and native rubber in the Far East, together with the calculated production capacity of other parts of the world.

ESTIMATED TOTAL AREA PLANTED IN RUBBER

Acres

	British Malaya	Ceylon	India and Burma	Netherland East Indies	B. N. Borneo Sarawak Brunei	French Indo-China	Total Middle East
1917	1,658,000	367,000	116,000	859,000	67,000	53,000	3,120,000
1918	1,886,000	403,000	119,000	979,000	74,000	61,000	3,522,000
1919	2,061,000	423,000	119,000	1,092,000	87,000	68,000	3,850,000
1920	2,181,000	433,000	119,000	1,153,000	97,000	75,000	4,058,000
1921	2,240,000	440,000	119,000	1,198,000	107,000	80,000	4,184,000
1922	2,260,000	443,000	122,000	1,229,000	113,000	83,000	4,250,000
1923	2,275,000	445,000	124,000	1,249,000	117,000	86,000	4,296,000
1924	2,288,000	446,000	125,000	1,269,000	119,000	89,000	4,336,000
1925	2,303,000	447,000	126,000	1,304,000	122,000	93,000	4,396,000

It will be noted from the above that during the six years ending with 1925 there was an increase in planted acreage of only 338,000 acres as compared with an increase of 730,000 acres for the three years preceding. Inasmuch as rubber trees cannot be tapped even on native plantations until they are at least four years old, it is not necessary to consider plantings subsequent to 1925 for 1929 and 1930 productions. The figures issued by the Rubber Growers Association of London for 1926 compare very favorably with the above estimates, allowing for increased plantings during 1926, with the exception of the figures for Netherland East Indies. The R.G.A. figures for these islands include 500,000 acres of native rubber, as compared with the estimate of 300,000 acres of native Dutch rubber included in the above tabulation (which is based on the investigations of the United States Department of Commerce). That the latter figure is more correct seems to be borne out by the following analysis made by the Rubber Division of the Department of Commerce.

NETHERLAND EAST INDIES

	European Estates				Native Estates	
	At End of Year		During Year			
	Planted Acres	Bearing Acres	Yields Lbs.	Yield Per Acre Lbs.	In 1,000 Kilos. From Div. of Com. D. E. I.	Area Tapped at 600 Lbs. to the Acre
1918	789,000	....	....	...	......	......
1919	842,000	....	....	...	13,000	18,000
1920	883,000	550,880	....	...	10,000	37,000
1921	897,749	560,178	133,281,298	238	6,000	22,000
1922	922,780	579,400	159,090,550	275	17,000	62,000
1923	953,669	619,945	179,701,355	290	36,000	132,000
1924	973,523	678,302	199,055,539	293	56,000	210,000
1925	1,025,428	751,893	233,303,400	310	88,000	323,000

TABLE 2

DISTRIBUTION OF CASINGS AND TUBES

Last 000 omitted

Year	Production		Exported		Retained in U. S. A.		Old Cars in Use	New Cars Produced	Produced for New Cars				Produced for Old Cars and Stocks		Per Old Car and Stocks	
	Casings	Tubes	Casings	Tubes	Casings	Tubes			Casings	Per New Car	Tubes	Per New Car	Casings	Tubes	Casings	Tubes
1922	40,000	47,780	1,326	937	3,900	46,843	9,773	2,590	10,180	3.9	9,900	3.8	29,600	36,943	2.9	3.8
1923	45,400	57,229	1,363	1,016	44,000	56,213	11,306	4,020	16,200	4.0	15,660	3.9	27,800	40,553	2.5	3.6
1924	51,500	66,700	1,250	1,104	50,300	64,679	14,287	3,600	13,360	3.7	12,950	3.6	36,900	51,729	2.6	3.6
1925	59,800	77,388	1,628	1,475	58,200	75,913	16,117	4,266	17,600	4.1	17,010	4.0	40,600	58,903	2.5	2.6
1926	60,500	74,300	1,497	1,127	59,000	73,173	18,095	4,295	17,710	4.1	17,890	4.2	41,300	55,283	2.3	3.1
1927	63,900	70,855	2,631	1,631	61,300	69,224	20,193	3,394	14,900	4.4	15,390	4.5	46,400	53,834	2.3	2.7
1928	78,500	80,000	2,500	1,700	76,000	78,300	20,600	4,358	19,160	4.4	19,200	4.4	56,800	59,106	2.7	3.0

NOTE: Casings and tubes figures are based on U. S. Census figures when obtainable, and upon U. S. Dept. of Com. estimates for other than census years. Their estimates are derived from reports of R. A. A. (Figures for 1928 are preliminary.) (Casing figures include solid and cushion tires.)

Assuming that a total of 4,400,000 acres is approximately correct for plantation areas in bearing, in the Middle East (exclusive of Siam) at a high average production rate of 350 pounds to the acre, a maximum production figure of 685,000 tons during 1929 is arrived at, which added to the maximum of 45,000 tons to be expected from other parts of the world gives a maximum potential production of 730,000 tons.

During the past six years the annual increase in world's consumption has averaged about 10 per cent as compared with an average annual increase of 7 per cent for the United States and 14 per cent for all other countries. An increase in world's consumption of 10 per cent during 1929 would mean a total consumption of 737,000 tons. The extent to which world's consumption will approach or exceed world's production during 1929 will largely depend on the consumption rate in this country as can be seen from the following tabulation, in which 1928 figures have been estimated in long tons from the latest reports available:

Year	U. S.	Per Cent Increase	Outside U. S.	Per Cent Increase	World's Total	Per Cent Increase
1922	301,449	70	108,317	10	409,816	48
1923	319,422	6	126,204	17	445,626	9
1924	338,144	7	136,874	8	475,018	7
1925	387,629	15	165,324	21	552,953	18
1926	366,000	6 (dec.)	174,037	5	540,037	2
1927	373,000	2	220,200	26	593,200	10
1928	435,000*	17	232,000*	5	667,000*	12

*Preliminary.

Using the statistical information in Table 1 and 2, it is possible to approximately estimate consumption for the United States (if the estimates of the automobile manufacturers of 5,000,000 cars produced in 1929 and 21,000,000 other cars in use can be taken as authoritative.) At the 1928 rate of replacement demand (See Table 2), 55,700,000 casings and 63,000,000 tubes would be required for replacements and additions to stock. At the 1928 rate of 4.4 casings and tubes per new car, 22,000,000 casings and 22,000,000 tubes would be required for new cars. Export requirements would bring the totals to over 80,000,000 casings and 85,000,000 tubes. Assuming that there is no increase in the quantity of crude rubber used during 1929 in the average casing, 380,000 tons would be consumed in the manufacture of casings and tubes or approximately 445,000 tons for the entire industry. (The percentage of rubber used in casings and tubes approximates 84 per cent of the total rubber consumed in all branches of the industry). If, however, the amount of rubber per casing is increased by approximately one-quarter of a pound, there would be 465,000 tons required by the American rubber industry. A 10 per cent increase in consumption outside of the United States added to this figure would give a total world's consumption of 720,000 tons. The accuracy of these estimates depends very largely upon the automobile production and registration estimates that are accepted by leading automobile authorities.

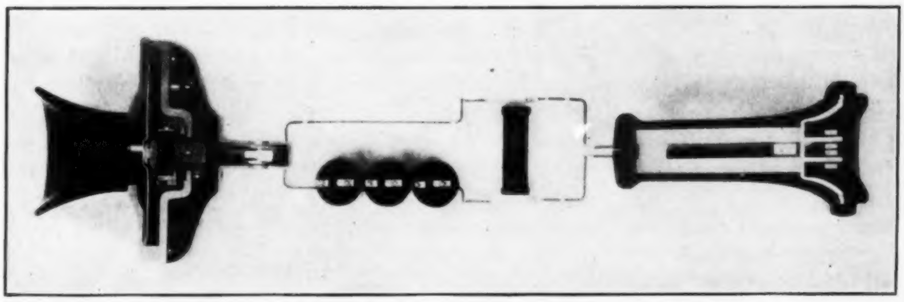
World's stocks of crude rubber on December 31, 1928 did not exceed 240,000 tons (final official figures on rubber afloat, and stocks in various countries are not yet available) distributed about as follows; in producing centers 55,000 tions; in manufacturing centers and afloat thereto 190,000 tons. At the 1928 rate of world's consumption these stocks represented barely four and one-half months supply and in previous years, notably 1924, 1925 and 1926, to judge from the price fluctuations (see Chart) this has not been sufficient for the world's needs. Assuming that American manufacturers have in present unusually large stocks of casings and tubes an additional 35,000 tons of surplus rubber there are surplus stocks sufficient for five months' supply at least year's rate of consumption. If however world's consumption increased in 1929 as much as 10 per cent over 1928 there would soon be an insufficiency apparent in what has been deemed in the past to be a necessary world's surplus. Marked fluctuations in rubber prices can be expected if world's rubber consumption figures in 1929 appreciably exceed those of last year.

Telephone Model Presented to National Museum

FORMAL presentation of a sectional model of a telephone transmitter and receiver, whose diaphragms can be vibrated in synchronism by an observer to illustrate the fundamental mechanism of telephony, was made to the United States National Museum of the Smithsonian Institution on October 24. The hard rubber casings of the mouth piece and receiver are readily identified in the illustration.

mitter diaphragm as would sound waves impinging upon it, and thereby compresses and releases the carbon granules of the resistance button. At the same time it vibrates the receiver diaphragm by means of mechanical linkage as if voice currents were passing through the transmission circuit.

For clarity of detail, transmitter and receiver are each four times the standard size; and the dry cells and induc-



Enlarged sectional models of transmitter and receiver simulate operation

In the model, illustrated above, the instruments are connected by an elementary transmission circuit, such as is used where no provision is wanted for switching or amplification. Demonstration of its working is obtained by means readings and the stock being worked. The net result is a linkage to the diaphragms of both instruments. When moved slowly back and forth the lever vibrates the trans-

tion coil are of the normal size. The model is enclosed in a mahogany case about four and a half by two feet, with a plate glass top. Instruments and case were constructed in the engineering shop of the Bell Laboratories. A special table is to be provided by the museum on which the model will be displayed; it will adjoin the Alexander Graham Bell Exhibit.—*Bell Laboratories Review.*

EDITORIALS

Spring-Dating Gains

TIRE manufacturers find much comfort in the fact that the hand-to-mouth buying policy of dealers has finally swung from a standoffish extreme to one of reasonable purchasing for future needs. Yet not long ago many distributers freely criticized tire makers for being unduly insistent in getting them, as they claimed, to tie up much of their capital in spring-dating orders. Evidently many have seen a light and now realize that the manufacturers' object was not wholly selfish. Now they appreciate the fact that through winter buying the factories can assure them of an even quality of goods throughout the year, that they can be saved from a vexing shortage should consumer demand suddenly become acute, and that they can carry and market many sizes and types of goods through the dull months which they could not otherwise profitably carry in stock during such a quiet period.

As for tying up dealer capital, that fear has not materialized, as manufacturers now carry the bulk of the investment burden. Moreover, dealers can now better protect their business through utilizing storage space which would otherwise remain idle. The reciprocal advantage obtained by tire makers inures to the benefit of distributers, consumers, and operatives. Labor is kept steadily employed, crews that have become expert are kept intact, there is gain in morale and efficiency, and, what is important to all concerned, the loss through labor turn-over is being distinctly minimized.

Getting Most for Wages

THE new "kilo-man-hour" yardstick for measuring the commonest yet most elusive factor in industrial operations—that of getting the utmost return for wages—is deemed so important that it may, it is said, be utilized in the next federal census. Certainly it gives rubber and other manufacturers serious food for thought. In seeking a more exact evaluation of management, the experts who have evolved the K-M-H basis for reckoning pay returns analyzed 3,500,000,000 man-hours of labor in 13,385 industrial plants employing 1,683,221 men and women. A striking revelation is that high wages and high production, other conditions being equal, go hand in hand. A case is cited in which $1,000 is paid out by one cotton fabric making concern for low-priced labor which yields but $548 worth of products, while another reaps $10,807 worth for $1,000 paid for higher grade labor.

Some variations exceed 20 to 1. The average among concerns in the same industrial line is 13¼ to 1, steel making showing the most uniformity. As for the rubber industry, it is not ranked as high as it should be in the list of efficiently-managed lines. The survey also shows that the industries which netted maximum profits were those obtaining the greatest value of product per thousand factory hours. Many economists learn with surprise that small manufacturers often produce more goods and at a lower labor cost than the big corporations. In sixteen out of fifty-three industries the smallest company of all had the highest rate of production, which is rather comforting for minor operators who had feared extinguishment by major ones.

The complex conditions obtaining in many rubber manufacturing plants, however, make the general and immediate application of such a simple, logical principle difficult. Still an earnest effort should be made along some such lines toward appraising more scientifically actual work done for pay in certain time units. If it be deemed impracticable to introduce at once something like the K-M-H system, an approach toward the solution of the pay problem may be made through the next best recourse. Some think that the latter is the piece-work system, and they believe that it can be utilized just as effectively with skilled help and the latest labor-saving devices as with reverse conditions. In fact, one of Akron's prosperous though not largest rubber concerns is so convinced of its value that it has worked so far from the fixed wage system as to pay even by the piece the laborers who unload crude rubber from the cars; and, besides providing operatives with a strong incentive for work, the company has also obtained a truer measure than ever before of actual production costs.

Would Outlaw Advertising Balloons

MANY cities in the United States are watching with interest the efforts of signboard and other out-door advertising concerns to combat the rising popularity of large rubber balloons for advertising purposes. To such adverse influence is credited an attempt which is being made in Los Angeles to forbid the use of captive balloons, and it is reported that an ordinance outlawing them has been prepared for adoption by the city council.

The ostensible reasons for prohibiting the gas-filled spheres are that they are a fire menace and a danger to aviators. The rubberized cloth used in making the balloons is produced by an Akron concern, but the balloons are made by several manufacturers. It is said that the passage of the ordinance will be strongly contested, and if adopted the legality of the measure will be tested in the courts.

What the Rubber Chemists Are Doing

Some Practical Aspects of Rubber Evaluation

R. P. DINSMORE[1]

THIS article embodies the remarks of the author as given before the Los Angeles Group of the Rubber Division, A. C. S., January 31, 1929. It reviews the difficulties of crude rubber variation, compares tests on blended rubber and gives examples of the results as reflected in several practical performance tests. Factory classification of rubber is considered and a control method given and the importance emphasized of efforts to correlate laboratory practice with service results.

In various papers, published in the past three years, E. C. Zimmerman and the writer have made references to the variability of crude rubber as determined by the properties of vulcanized compounds of various types. We were, I believe, the first to point out the chief stumbling block in the way of establishing a standard test formula for evaluating crude rubber, namely, the variation in both quality and rate of cure produced by curing the same rubber with different curing agents.

At the outset we were confronted with difficulties which resulted from a deplorable lack of standardization of rubber testing methods, and more specifically from a lack of agreement as to the proper way to select comparable cures. Indeed, it is obvious that these drawbacks have been among the major causes for lack of correlation of available data on the subject. We have stressed the importance of considering those properties of the vulcanizate which are reflected in the performance of the finished product, and have stated our objections to many of the popular criteria, such as "slope", tensile product, tensile and coefficient of vulcanization.

We had concluded that aging should be the chief criterion of best technical cure. Accelerated age tests cannot be relied upon for comparison of different mixes, but experience has shown that for lightly loaded mixes hand tear is a reliable method of fixing the best aging cure. With this as a means of selecting the time of cure, the quality was studied by comparing the stiffness of the stress-strain curve at best cure. Later, in a paper on acceleration classification, it was shown that these conclusions might properly be modified when dealing with loaded mixes. Here the cures, as selected by hand tear and by maximum tensile product, were in substantial agreement, except in the case of non-accelerated stocks.

Much has been written about the causes of variation of crude rubber. A great deal of this work has been done on rubber-sulphur mixes, and just how this may be translated into the terms of practical accelerated mixes is problematical. Yet we may accept the general facts that the age of the rubber tree at time of tapping, the type of soil, the nature of the season, the method and speed of coagulation and the method of drying and sheeting, all have some influence on rubber properties. We must pass hastily over this phase of the matter, not because it is unimportant, but because, at present, we cannot expect rubber growers to furnish us with uniform rubber, when we are unable to tell them conclusively what properties we want and how to determine them. The work of the Crude Rubber Committee and The Physical Testing Committee of the Rubber Division is calculated to change this situation for the better. Just now we are concerned with asking whether the variation in crude rubber, as received at our factories, is a cause for concern and, if so, what we may do in our factory practice to offset it.

As previously mentioned, variations in both cure and quality are to be expected. Cure, however, is the most important factor Some time ago we studied variation between bales of the same lot and finding as much variability as between lots, we checked a number of bales and found considerable variation throughout the rubber in a single bale.

In a recent test to determine the efficacy of blending, tests were made from each of a number of batches of rubber taken from tne breakdown mills. In all, 48 samples, representing 48 batches were taken over a 7 day period and were studied in a pure gum captax friction, activated with zinc oxide, with results as follows:

	Tensile Kg./cm²		700% Modulus Kg./cm²
24 Tests between	160-180	6 Tests between	140-160
15 Tests between	140-160	7 Tests between	120-140
9 Tests between	120-140	18 Tests between	100-120

This shows a rather wide variation even after blending.

Another check made to see the effect of using a high grade tread rubber which had been tested in the friction formula above, showed these results on 20 samples.

FRICTION TEST—20 SAMPLES

Tests	700% Modulus Kg./cm²
2, between	160-180
1, between	140-160
10, between	120-140
7, between	100-120

TREAD TEST—20 SAMPLES

Tests	500% Modulus Kg./cm²
3, between	170-190
9, between	150-170
8, between	130-150

Point for point there was a general correspondence between the high and low tests for the two stocks although there were some reversals. Here again the fluctuation is considerable. The above data are typical of a large mass which, unfortunately, time did not permit my condensing to suitable form for this hastily prepared review.

It is now pertinent to ask whether these results are reflected in any practical performance tests. Two rubbers were selected by the friction formula, giving moduli of 120 and 57 respectively. These were compounded in a solid tire stock where the differences were apparently entirely eliminated. However, on a blowout test, the high grade rubber gave about 45 per cent more mileage than the low grade. Two other rubbers were selected having modulus figures in the friction stock of 147 and 37. Here the solid tire stock showed about 8 per cent difference in modulus, but there was 50 per cent difference in the mileages to blow out.

In a high grade balloon tread stock, rubbers which were selected because they gave modulus figures of 104 and 53 in the friction test, gave 88 and 84 in the tread stock with abrasion loss figures of 10.9 and 11.5 respectively. The road wear resistance was in the ratio of 112 to 100.

Another test was made on a pneumatic truck tire carcass for blowout. The rubbers tested 105 and 70 modulus. On a slow speed test there was no difference beyond the experimental error. The high speed test showed a difference of 60 per cent in favor of the high-test rubber. This was on one tire for each rubber and cannot be considered as any more than indicative.

It would seem that there is enough variation of a kind which, to some degree at least, is reflected in service tests, to warrant an interest in reducing the effects in our factory stocks.

In considering the classification of rubber for factory use we have always been confronted with the problem of blending or homogenizing a sufficient quantity to permit grading. If rubber varies from bale to bale in the same lot, we cannot be sure of the nature of any given bale unless we test it individually. The figures given for the seven day check indicate the difficulty involved. In this case the batches were made of "pie-cut" rubber taken from four lots and ten batches were blended by taking one slab from each of ten batches and massing on the mill. Even with this procedure, the variation was so great as to be discouraging. Study of rubber variation over a prolonged period has shown that the variation is erratic; that is, the general run of rubber will come high test for a few weeks with individual fluctuations, of course, and then it may swing to an average, medium or low test. This in itself makes lot blending ineffective.

[1]Chief chemist, Goodyear Tire & Rubber Co., Akron, O.

The only reasonable alternative seems to be to mass as much rubber as is practicable on a mill or masticator and test each batch. From the results of these tests the rubber can be classified as desired, possibly into high, low and medium classes. Compound formulas can then be made to accommodate these classes of rubber. Such a proposal requires, for many factory conditions, a rapid test. Experiments have convinced us, however, that an actual modulus test is essential. This requires sampling, compounding, curing and testing within a very brief time. By having equipment close at hand and using short, high-temperature cures, and using cold water to condition the sheets, a single point modulus test can be obtained in less than 25 minutes after the rubber is sampled. It is thought that this is within practical working limits.

This plan is based, of course, on the assumption that a suitable test formula is available which will properly select rubber for the general run of factory stocks. As to the nature of such a formula, I believe it must be largely determined for the individual case. Certainly our experience would indicate that it would not do to test with one accelerator and compound with another. I must confess to being somewhat disconcerted by the service results, particularly of the solid tire stock. It must be borne in mind that the number of service tests was limited.

It is not intended that anyone should conclude that physical tests made upon a lightly-loaded mix are more significant as to ultimate service than tests on the actual compound. It may eventually prove that certain properties resulting from the original crude rubber are masked by compounding so that they are difficult to uncover in our present laboratory tests and are better indicated by the pure gum stock. Certainly we must view with caution the opinion that identity in laboratory tests such as stress-strain, resilience, and abrasion, necessarily insures identity of service performance. As we refine our laboratory practice and correlate it more exactly with service results, we will throw more light on this interesting subject.

Aging Effects of Carbon Black in Rubber

THE continuation of their earlier work on the composition of various properties of carbon blacks, has been published by L. B. Cox and C. R. Park as Part 3[1].

Part 1[2] discussed the characteristics of the blacks themselves and their behavior in uncured rubber. Part 2[3] described their action when compounded in cured stocks containing various accelerators. Part 3 is a discussion of the effects of aging on various properties of the same base mix of rubber and sulphur with the same carbon blacks and accelerators.

The stocks were aged 18 months in a dark cabinet with slow air circulation. The temperature was the average room temperature, probably near 65°F. Tests were made of hardness, modulus, tensile and abrasion. The differences in aging behavior caused by the different carbon blacks seem to be closely connected with their absorptive capacities. It is to be expected that those blacks with very active surfaces will carry larger quantities of oxygen into the stock and be more active in re-adsorbing and transferring further quantities to the rubber.

The authors summarize their investigation as follows:

Summary

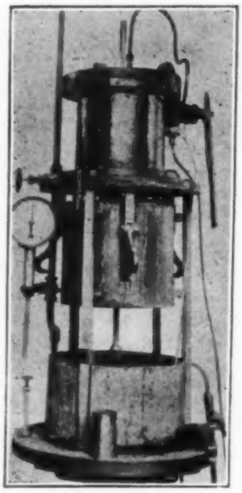
1. The aging properties of compounded rubber stocks are affected by the carbon black which is used.
2. The order of increasing superiority for the blacks tried is Super Spectra, Micronex, Charlton, Goodwin, and Thermatomic.
3. The order of increasing superiority of accelerators is diphenylguanidine, hexamethylenetetramine, ethylidene-aniline, mercaptobenzothiazole. The last two are put in this order mainly because of the inferior original properties of ethylidene-aniline.
4. Results of tensile, abrasion, and weight increase tests are in reasonably good agreement.
5. The effect of acidity in any compounding material is neutralized in a stock containing zinc oxide.
6. Stearic acid is without effect upon aging properties of cured rubber.

[1] "Carbon Blacks and Their Use in Rubber," III—Aging Effects. *Indus. Engr. Chem.*, Oct., 1928, pp. 1088-1091.
[2] *Ind. Eng. Chem.*, 20, p. 621 (1928).
[3] *Ind. Eng. Chem.*, 20, p. 706 (1928).

Variability in the Plasticity of Plantation Rubber[1]

F. L. ELLIOTT

IN this investigation the samples were tested by the Ira Williams parallel plate plastimeter at 100 degrees C. and in the case of masticated rubber only by a form of extruder at 90 degrees C. The extruder designed by the staff of the Ceylon Rubber Research Scheme, pictured in the illustration being operated as follows:



Extruder for Testing

The sample was placed in the stainless steel container, one inch in diameter, into which passed a piston carrying a load of 130 pounds (giving 165 lbs.—sq. in. pressure on the sample); this was raised or lowered by hydraulic power. The inside of the container was in the shape of an inverted cone and tapered to an orifice ⅛-inch in diameter. The rubber was heated for three quarters of an hour before extruding, and the rate at which the sample extruded through the orifice was measured by the fall of the piston indicated on the dial. The volume extruded was calculated from this figure. Dimensions and quantities were arranged so that extrusion took place slowly—an average figure was 12 c.c. in 1 hour.

In addition to the variable factors in the preparation of rubber mentioned in the summary below there are many more waiting for investigation, and many others have been tried which seem to have very little influence on plasticity. For convenience they have been summarized in the following table. De Vries tests were carried out with a parallel plate plastimeter on raw rubber only, generally shortly after preparation. The Ceylon Rubber Research Scheme tests were on raw and masticated rubber using the parallel plate plastimeter, and on the latter, the extruder described in this paper; the tests were mostly carried out six months after preparation.

SUMMARY OF THE INFLUENCE ON PLASTICITY OF VARIABLE FACTORS IN THE GROWTH AND PREPARATION OF RUBBER

Factor	de Vries	Plasticity according to Ceylon Rubber Research Scheme
Growth		
Unfavorable conditions of growth.	Increases plasticity.	——
Young trees.	Increase in plasticity.	
Period of rest from tapping.	No effect.	Increase in plasticity.
Spraying trees with Bordeaux mixture.	——	No effect.
Coagulation		
Dilution of latex.	Excessively—rather increases plasticity.	——
Use of phenol in latex.	——	Increase in plasticity.
Use of paranitrophenol in latex.	——	No effect.
Substitution of formic for acetic acid.	——	No effect.
Excess of acetic acid.	Slight increase.	Slight decrease.
Excess of formic acid.	Slight increase.	Slight increase.
Excess of alum.	Slight increase.	——
Excess of sodium silicofluoride.	——	Slight increase.
Excess of sulphuric acid.	Increase in plasticity.	——
Excess of oxalic acid.	Increase.	——
Subsequent treatment.		
Hot air drying.	No effect.	Increase.
Maturing before creping.	Practically no change; viscosity increased.	Decrease.
Smoking.	——	Increase.

[1] Paper read at a meeting of the Birmingham and District Section of the Institution of the Rubber Industry, December 8, 1927. *Trans. Inst. Rubber Ind.*, Vol. III., No. 6, April, 1928, pp. 468-477.

DURING THE CALENDAR YEAR 1928, CANADIAN EXPORTS OF PNEUMATIC casings numbered 1,674,553 as compared to 1,679,126 in the same period of 1927. Exports of inner tubes numbered 1,555,085 in the calendar year 1928 as compared to 1,796,619 in the calendar year 1927.

American Rubber Technologists

Technical superintendents, chemists, process and development engineers in rubber manufacturing and reclaiming plants, research, testing and service laboratories are invited to send their biographical data to us for publication

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New Machines and Appliances

Black Rock Cutting Machine

Washer Cutting Machine

THE machine shown herewith is an improvement on the jar ring and washer cutting machines formerly built by this manufacturer in that it does away with rubber covered mandrels and an air stripping machine.

The work is slidably mounted on a rotating steel mandrel, and a circular knife, driven at high speed does the cutting of jar rings, rubber washers, friction tape, rubber electrical tape, asbestos rings, etc. Rolls or tubes can be cut into small pieces.

Power transmission from the motor is so arranged as to permit varying the speed of the knife and of the work, as desired.—Black Rock Manufacturing Co., Bridgeport, Conn.

Automatic Cycle Controller

AUTOMATIC controllers have been used for years to regulate temperature, condensation, discharge and water cooling of tire presses. Now it seems that dependable, accurate regulation of the entire cure, without the failure of a heat is possible by use of the new controller here described. The following tells what it actually does.

The rubber company's specifications were: "Fill air bags in five minutes; one minute to test for air leakage in bags (5-lb. drop permissible); thirty minutes to rise to vulcanizing temperature; two hours to hold at this temperature; three minutes to blow down steam; thirty minutes opening of water inlet and water draining for cooling; ten minutes to warm molds to facilitate removal of tires. And throughout the entire cure, whenever the hydraulic pressure drops from 1,500 lbs. to 1,200 lbs., the controller shall automatically relieve the bag pressure."

Now follows a time schedule of the operations automatically performed by the cycle controller—exact as to temperature and time.

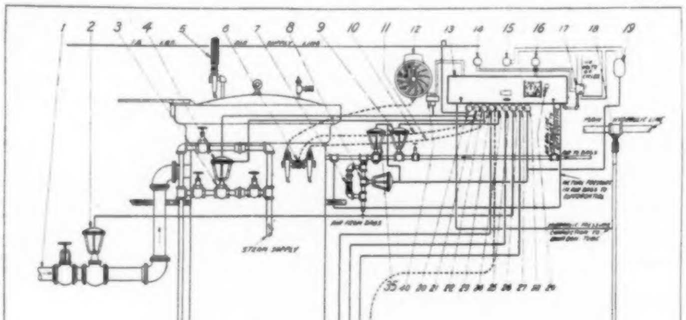
START. TIME—0:00. Operator opens hydraulic valve. When hydraulic pressure reaches 800 lbs. (or as set), a hydraulic pressure spring causes the resetting electric motor of the controller to rotate the entire cam shaft, bringing all cams to their starting point where it stops.

TIME—0:05. Immediately a separate thirty-minute electric clock starts to rotate the leak test cam 38, and this cam causes diaphragm valve 9 to open, allowing the air to enter the air bags for a five-minute period. At the end of five minutes valve 9 closes and then begins the one-minute bag leak test. If the air bag pressure falls 5 lbs. during the one-minute test period the thirty-minute clock will be stopped by a differential pressure arrangement in the controller and red signal light 16 will summon the operator. The operator must then correct the faulty condition and restart the thirty-minute clock by turning cam 38 with a special key until lever 39 is opposite a mark on the cam. The air bag leak test then repeats itself but if the air leak has not been eliminated, so that during the second leak test more than 5 lbs. is lost in one minute, the controller will again stop and the red lamp 16 will again light.

TIME—0:06. (If the air leak test has been successfully passed).

The ten-hour electric clock driving the main cam shaft starts and the controller automatically begins the curing by opening steam inlet valve 3 and condensation valve 33. The thirty-minute rising period and the two-hour hold are accomplished with precision and there is nothing particularly new in this connection.

PERIOD 0:06 TO 2:36. A valuable safety provision is the auxiliary (or standby) steam inlet tube system. There are two complete and duplicate steam inlet cams, air valves and tube systems, which operate throughout the cure. The steam inlet diaphragm valve 3 is furnished with a duplex top 4, one diaphragm section of which is connected to the regular steam inlet tube system 10 in the controller. Now if, at any time during the cure, the regular tube system 10 should leak or become inactive, the cure will be handled without interruption by the auxiliary 11. The possibility of both tube systems failing during the same cure is indeed remote.



Tagliabue Automatic Controller Applied to a Tire Vulcanizer

At the End of the Cure or at 2:36. Steam inlet valve 3 and condensation valve 33 close. Blow off valve 30 opens for three minutes.

Time—2:39. Blow off valve 30 closes. Water inlet valve 2 and water drain valve 31 open for thirty minutes.

Time—3:09. Water inlet and water drain valves both close. Steam inlet valve 3 and condensation discharge valve 33 open for ten-minute mold-heating period for easy removal of tires.

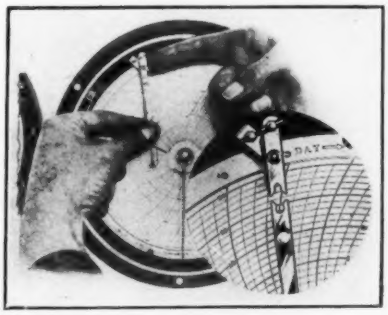
Time—3:19. Steam inlet valve 3 and condensation discharge valve 33 close. Blow off valve 30 opens. Air bag inlet valve 35 closes and air bag relief valve 8 opens, venting the pressure in the bags. Pressure switch 19 simultaneously lights green lamp 15, announcing the finish of the cure. The ten-hour clock of the controller stops automatically when the hydraulic pressure is released to open the press.

Throughout the Entire Cure. Whenever the hydraulic pressure falls from 1,500 lbs. (its normal pressure) to 1,200 lbs., or less, the air bag pressure will automatically be vented by valve 8 and the air inlet line shut by valve 35. A total failure of the hydraulic pressure is exceedingly unlikely, for most rubber plants have installed complete safeguards against this event. Thus each hydraulic pump has a duplicate standing by ready to start should the regular pump fail. However, before the standby pump can bring the hydraulic pressure back to 1,500 lbs. the pressure will drop momentarily and then a release of the air bag pressure is desirable. This is accomplished automatically as just described. Of course when the hydraulic pressure has been restored, valves 8 and 35 return to their former positions, with vent line closed and inlet open.

The construction of the cams are such that the time periods can be readily adjusted. The adjustment of the temperature time cam, for example, permits of increasing the duration of the hold period up to almost twice its minimum length. The adjustments of other time periods are likewise generous.—C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.

A New Recorder Feature

An unique and distinguishing feature for charting recorders is the detachable pen arm here pictured. It is the most recent improvement and may be



Detachable Pen Arm

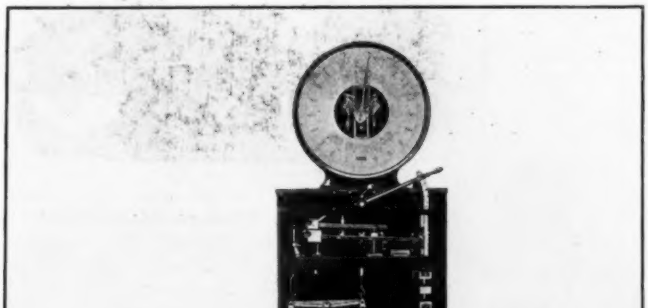
quickly replaced if bent or broken by detaching the arm with the finger nail, whereupon a new arm may be slipped into place. The lower end of the arm is open to facilitate the removal, cleaning and inking of the pen. The removal and replacement of this detachable pen arm entails only a few seconds interruption of the record, and the instrument is in operation again.—The Foxboro Co., Inc., Foxboro, Mass

Rubber Factory Scale

An efficient, ruggedly constructed scale for use in rubber factories is illustrated. It has no springs, gives direct-reading indication and is equipped with a simple hand-operated locking device that locks the tare beam lever and thus protects it and the indicating mechanism by one turn of a handle.

One style, having 6 ton levers is built in capacities of 3,525; 6,050; 7,050; and 12,000 pounds. The 8 ton lever type ranges in capacity from 3,525 to 17,000 pounds comprising six different capacities within these limits.

The built-in type has, in addition, the special features compensating, double-pendulum, low multiplication indicating mechanism; as well as rust-proof, cast bronze sectors. Dials can be furnished for "front-and-back" indication. Movement of the indicator is regulated by an hydraulic device.—Toledo Scale Co., Toledo, Ohio.

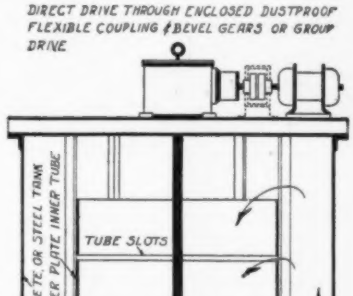


Toledo Built-in Type Factory Scale

Unique Agitator

A NEW type of agitator embodying a novel agitating principle is here depicted. It is tubular in construction and provides an efficient mix at great saving in power and time. These new agitators initially demonstrated their unusual operating economy in the cement industry on cement slurry and in the paper industry on heavy clay fillers. They are applicable to all liquid and semi-fluid mixtures and are worth considering by rubber manufacturers for thin rubber solutions, latex compounding, etc.

This agitator is a development of the



Hill Tubular Agitator

former marine propeller type. The propeller located in the throat of the tube produces a downward or an upward current without turbulence or eddy currents. The tube and bottom deflector control and direct the flow of the current so that the entire volume of the tank is in circulation and without dead areas. Thorough and instantaneous intermixing takes place between the upward and downward currents through the tube slots. Deposits or precipitates are prevented from forming or

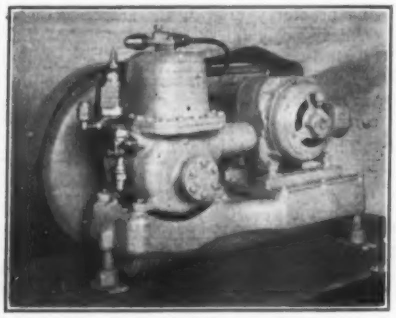
are swept off the bottom of the tank by the propeller wash.

The time required for agitation is short. Circulation throughout the tank begins immediately with the propeller movement. Power consumption is low because only skin friction in the tank and tube must be overcome. The agitator does not require constant operation for it will instantly pick up any deposit which has not solidified when the unit is idle and very quickly bring the contents of the tank to uniformity.

The apparatus is adapted to any tank of cylindrical form.—The Hill Clutch Machine & Foundry Co., Cleveland, O.

Rubber Pad for Oil Burner

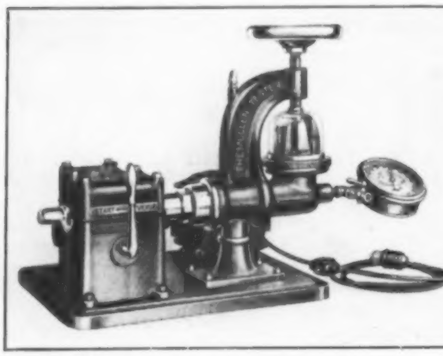
THE illustration herewith shows an excellent appreciation of the value of rubber in appliances for domestic heating and refrigeration; situations where vibration



The Williams Oil-O-Matic Burner

and humming noises must be reduced to a minimum.

In the machine shown here, the motor operating the unit is mounted on a thick cushion or pad of special rubber, through which the bolts holding the motor to the metal bed plate pass. These pads are very durable and are not affected by extremes of temperature. Any vibration of the motor is absorbed and deadened before it can reach down to the foundation on which the unit rests, or otherwise to the boiler or refrigerator. Both mechanical and acoustic vibrational effects are thus suppressed, thus adding greatly to the desirability and adaptability of such machines in domestic situations. The rubber pad does it.—Williams Oil-O-Matic Heating Corp., Bloomington, Ill.



Mullen Fabric Testing Machine

Self-Controlled Sump Pump

Of interest to engineers and plant managers in the rubber industry is the motor-driven sump pump shown on this page. For quickly removing water or other

Motor Driven Pump

liquids from sumps or settling basins it is an efficient, sturdy unit.

One of its special features lies in the employment of a hollow shaft for the motor. The pump shaft extends up through the motor shaft and thereby allows the use of one thrust bearing for both motor and pump. It will be noticed in the illustration that this bearing is mounted in a housing on top of the motor.

The pipe that supports the pump is bolted through to a cast iron plate to which also the motor is bolted. This is for the purpose of preserving the alinement of pump and motor. A float in the sump actuates a switch which starts or stops the motor in accordance with the level of the liquid to be removed.—American Well Works, Chicago, Ill.

Fabric Tester

THIS is a power-driven machine designed to measure the bursting strength and the elongation of materials before bursting. It is capable of testing goods ranging in bursting strength from 600 to 1,500 pounds per square inch, as well as much lighter materials; and for the latter, a pressure gage of small capacity is usually furnished.

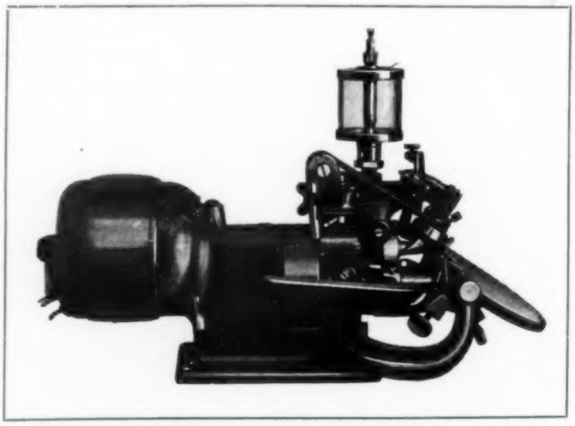
The tester, gear box and motor are mounted on one supporting frame and when making a test, the machine is started by the simple movement of a lever, which is reversed as soon as the breaking point of the material is reached.

Equipped as it is with a motor and speed reducer, the machine is a labor saver where much testing of this nature must be done, as compared with hand testers. It is especially adaptable to the rubber industry for determining the relative cooperation between warp and filling of calendered fabrics.—B. F. Perkins & Son, Holyoke, Mass.

USMC Trimming Machines A and B

THE improved trimming machine here shown has materially extended the scope of previous designs, without eliminating its compactness. In addition to trimming regular flat rubber heels, rubber soles and taps, the later design carries optional fittings to trim in one handling whole heels, scarfed heels, wedge, cupped orthopaedic and boot heels, pedal pads, fan belts, rubber mats and miscellaneous flat articles.

Two rapidly rotating, flat-edged knives are employed that cut by a shearing action, producing a clean, smooth cut close to the trimmed edge. The knives are of rugged construction, with a flat cutting edge and are supplied by the manufacturer of the machine. Dull knives are easily replaced and will be resharpened by the manufacturer at a nominal cost. The machine affords perfect protection to the operator and



Model B Trimmer—Motor Drive

to the articles to be trimmed, resulting in a reduction in damaged work and a correspondingly increased production. Experience has proved that adjustments are simple and the cost of maintenance practically negligible.

It is built in two types—Model A, for factory power, and Model B with motor drive.—United Shoe Machinery Corp., Boston, Mass.

AUSTRALIA APPEARED AS THE LEADING outlet for American rubber hose during December 1928 with 55,913 pounds, valued at $14,882.

Editor's Book Table

Book Reviews

"Gummi-Kalender 1929." Jahrbuch der Kautschuk-Industrie. Ein Hilfcbuch für Kaufleute, Techniker, Handler und Reisende der Kautschuk-, Asb est- und Celluloid-Branche. Edited by Prof. Dr. Ernst A. Hauser and Dr. Kurt Maier. Published by Union Deutsche Verlagsgesellschaft, Zweigniederlassung Berlin. Cloth, 3⅞ by 5⅞ inches, 456 pages.

This little year book, as is known, is intended to be an aid to merchants, technicians, dealers and salesmen of the rubber, asbestos and celluloid industries. The 1929 issue, which has just appeared, while retaining the main features of its predecessors, has been carefully revised and amplified to bring it up-to-date. Thus in the technical section, a short article on the uses and treatment of latex has been added. Also various conversion tables, and a table of atomic weights have been included, while in addition the method of calculating belting drives has been explained and the chief regulations affecting the manufacture of rubber and celluloid goods have been summarized. Latest business reports of some of the leading German rubber and asbestos firms again find a place, besides a variety of information calculated to assist the rubber man.

"Handbook of Chemistry and Physics." By Charles D. Hodgman, M. S., Associate Professor of Physics and Norbert A. Lange, Ph. D., Assistant Professor of Organic Chemistry, both of the Case School of Applied Science. Chemical Rubber Publishing Co., Cleveland, Ohio. Leather 4⅛ by 6¾ inches.

This is the thirteenth edition of this ready reference pocket book of chemical and physical data ond contains a completely revised and enlarged section on the specific gravity of aqueous solutions. A new form of table has been adopted giving, in addition to the specific gravity and Baumé hydrometer reading, the mass of substance in solution in grams per liter, pounds per cubic foot, and pounds per gallon. These latter values have been computed directly from the specific gravity and per cent of substance in solution.

Among other additions of interest, are ethyl alcohol tables giving the specific gravity of aqueous solutions referred to water and the same temperature and extensive data on sound absorption.

"American Railway Association Specifications for Mechanical Rubber Goods," is the title of a 40-page pamphlet issued by The Rubber Association of America, Inc., 250 West 57th St., New York, N. Y.

The booklet sets forth "Standard" and "Recommended Practice" specifications for various types of rubber hose commonly used by railroads, including "General Instructions on Standard Methods of Tests for Mechanical Rubber Goods."

Prior to 1923, every railroad had separate and distinct specifications for hose, and to avoid waste and confusion resulting from this condition, the Committee on Specifications and Tests for Materials—Mechanical Division of the American Railway Association, and the Specification Committee—Mechanical Rubber Goods Manufacturers division of the Rubber Association, joined in formulating A. R. A. "Standard" and "Recommended Practice" specifications.

For the last five years the Mechanical Goods Division of the Rubber Association has urged the adoption of these A. R. A. specifications, as they have been revised from time to time, by individual railroads buying rubber goods according to detail specifications. Today it is estimated that 90 per cent of the railroad hose bought under detail specifications is purchased according to these specifications. Copies of the booklet are available upon application to the Rubber Association of America.

New Publications

"Crude Rubber." Under this title H. Hentz & Co., Hanover Square, New York, N. Y., have issued a compilation of statistics on crude rubber, production, consumption and prices, automobile production, U. S. consumption of gasoline. Figures are also given from consular reports showing monthly tonnage of rubber invoiced to the United States during 1928. Plantation rubber areas are tabulated for 1904 to 1927 together with maps indicating where rubber is grown.

"Garlock Packing Service" is the title of the beautifully gotten up catalog of The Garlock Packing Co., Palmyra, N. Y. This publication is a fine example of the printing art bound in artificial leather. The book is fully illustrated showing, in colors, and blue print drawings and photographically the company's full line of packing service. A number of typical factory and laboratory views are given. The publication bespeaks the high quality of goods and service furnished by this enterprising company.

"Save the Oil" is a 12-page booklet by the Garlock Packing Co., Palmyra, N. Y., in which the oil return packing service is described as rendered by special oil scraper rings built by the company.

The Black Rock Manufacturing Co., Bridgeport, Conn., has issued a new catalogue of cutting machines. This company, being the leading specialists in rubber cutting machinery desires the trade to submit any cutting problems to them for solution.

Mechanical Rubber Craft, Catalog E., of the Lavelle Rubber Co., 320 W. Illinois St., Chicago, Ill., illustrates and describes the various styles and sizes of mechanical rubber specialties carried by the company.

"Le Recaoutchouteur Francais," is a new French trade journal issued bi-monthly in the interests of the French retreading industry. It is the official organ of the Syndicate General des Patrons Recaoutchouteurs de France et des Colonies (General Association of the Retreaders of France and the Colonies) now being formed. The editor and founder is Leon Eglene, the editorial offices at Rue du Sport, Vichy (Allier).

Index to A.S.T.M. Standards and Tentative Standards, as of September 1, 1928. This index, comprising 95 pages, 6 by 9 inches, is issued by the American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa.

The index is designed to be of service to those familiar with the society's standards in locating any specification or method of test in the bound publications in which it appears, and, as well, to those interested in ascertaining if the society has issued any standards on a specific subject.

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SEAT, No. 1,273,703, M. J. Whelan, closet seat, appeal filed Dec. 28, 1928, C. C. A., 2d Cir., Doc. 10320, Brunswick Balke Collender Co. v. The Seamless Rubber Co., Inc. *Official Gazette*, Vol. 378, p. 912.

METER, No. 1,458,920, F. J. Troll, road bearing meter, D. C., N. D. Ohio, E. Div., Doc. 2281, The Black & Decker Mfg. Co. et al. v. The Firestone Tire & Rubber Co. et al. Dismissed without prejudice Jan. 3, 1929. *Official Gazette*, Vol. 379, p. 6.

Treasury Decisions

BALLS, No. 7644. Protests 214839-G, etc., of J. A. Hearn & Son, Inc. (New York). Rubber Balls, Painted—Toys—Painted rubber balls classified as toys at 70 per cent ad valorem under paragraph 1414, tariff act of 1922, are claimed dutiable at 30 per cent under paragraph 1402.

Opinion by J. Sullivan. The sample is a rubber ball a little over 8 inches in diameter, fancifully painted. It was found from the testimony that the size of the balls and their use takes them out of the class of toys, and that they are not used exclusively for amusement and evidently were not so designed. The fact that they are used in play does not make them toys. The weight of the testimony showed that they are used in physical exercise. On the authority of G. A. 8807 (T. D. 40210), affirmed in United States v. Stewart (12 Ct. Cust. Appls. 533, T. D. 40734), the balls in question were held dutiable under paragraph 1402 as claimed. *Treasury Decisions*. Vol. 55, No. 4, p. 19.

BALLS, No. 7650. Protest 310957-G of George Borgfeldt & Co. (New York). Rubber Balls.—Rubber balls classified as toys at 70 per cent under paragraph 1414 are claimed dutiable at 30 per cent under paragraph 1402.

Opinion by J. McClelland. Rubber balls were held dutiable at 30 per cent under paragraph 1402 on the authority of Abstract 6133, affirmed in United States v. Woolworth (16 Ct. Cust. Appls. —, T. D. 43136). *Treasury Decisions*, Vol. 55, No. 4, p. 20.

Salvaging Rubber Factory Waste

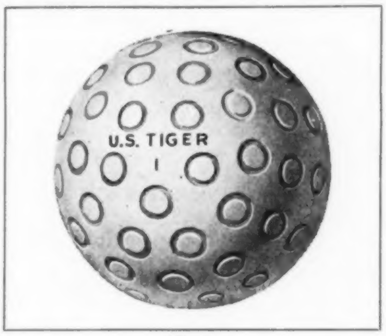
T. E. Koke tells in the *Scientific American* how, among many others, the rubber industry has been benefited by waste salvaging. The textile waste from old rubberized fabrics that had been treated with sulphuric acid in reclaiming, and which had been flushed into a river, was finally caught in a screen and a paper mill found it ideal for making chip-cardboard. The rubber overflow trimmed off beads in making clincher tires, being found to have 30 per cent of free zinc oxide, was readily bought by a copper-reducing company. Short ends of tinned piano wire used in the bead of straight-side tires were taken by a concern which before had detinned only old tin cans. Burlap pouches in which raw rubber had been baled were first sold to a roofing paper maker for $12 a ton but later to cotton shippers for $30. Old small-size tires found a market in Spain for peasants' sandals. Cotton wrapping tape which had been used in making inner tubes was first sold at a cent a pound for use in roofing paper, but later a carpet company making rag rugs bid 7 cents for all that could be supplied.

CANADIAN EXPORTS OF RUBBER BOOTS AND SHOES TO FOREIGN countries during the calendar year 1928 numbered 2,046,081 pairs valued at $3,509,660 and canvas rubber-soled footwear was shipped to the amount of 7,376,460 pairs valued at $5,092,208. This compares with 1,178,884 pairs of rubber boots and shoes valued at $1,865,672 and 5,491,164 pairs of canvas rubber-soled shoes valued at $3,835,443 shipped from Canada in the calendar year 1927.

New Goods and Specialties

New Design in Golf Ball

The golf ball department of the United States Rubber Co., 1790 Broadway, New York, N. Y., has announced the addition to its line of a new golf ball, the Tiger. This ball is the result of long experimentation in the development of a radically new marking and cover construction. A remarkable distance in flight and run is possible because the cover is smooth, with few indentations, and consequently slides through the air with less resistance, and yet there are sufficient indentations to properly brace it and hold it true in flight. Every Tiger ball is given many coats of paint, resulting in an excellent and pleasing appearance. The paint stands up perfectly in play. All of these balls carry a guar-



Tiger

antee to be free from any defect of workmanship or material and will be replaced if they do not give satisfactory service.

Golf Ball Cleaner

The Burnham golf ball cleaner is an effective device which can be conveniently carried about while playing. It has a

British Cleaner

double wall forming a shallow reservoir to hold the necessary water, the piece of soft sponge on which the ball is cleaned can be repeatedly moistened by the water which is forced up through a small hole in the container. The action of pressing the ball on the sponge has the necessary effect. On releasing the pressure, suction takes up the surplus water. The cleaner can either be attached to the golf bag by a cord, or may be carried in the golfer's pocket without fear of the water escaping.

This cleaner is patented under British patent law, and patent application is also pending in America and other countries.—St. Helens Cable & Rubber Co., Ltd., Slough, England.

Bathing Sandal

One of the new all-rubber bathing sandals is made in red, blue, green and black

Siren

with white trimmings, very attractive and sporty in appearance. The upper is made of floral patterned rubber with trimmings, toe cap and heel in contrasting colors. The sandal has a crepe rubber sole and is called the Siren. The manufacturer is The North British Rubber Co., Ltd., 204 Tottenham Court Rd., London, W. 1, England.

Inflated Ball

The Fairylite ball, it is said, is so light that it can be thrown around the most delicate of ornaments without danger of any

Fairylite

damage. It is an inflatable ball, without the usual inside bladder, and is fitted with a patented valve which requires neither tieing nor plugging. The balls are manufactured in seven sizes, ranging from 4½ to 14 inches in diameter, and are attractively decorated. The manufacturer is S. Erhard & Co., 8 Bradford Ave., London, E. C. 1, Eng.

Balloon Tire Patch

A new type of stick-on patch, the Super-Life balloon tire patch, has been designed by The Polson Rubber Co., Garrettsville, O. The advent of low pressure tires practically made obsolete the old style wing patch for tire repair as it would not stand the greater flexing action of balloon tires. This is practically true of nearly all stick-on patches as the heavy fabric construction of such patches was so rigid that they would not only not last themselves but created a stiff spot in the tire which contributed to the breakdown of the casing. This new patch, to overcome all these difficulties, is made almost entirely of rubber, with just enough fabric reinforcement to give it the necessary strength.

Combination Beach Skirt or Beach Cape

There has recently been put on the market a new bathing creation—a combination beach skirt or beach cape. This article

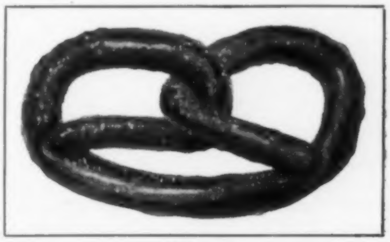
New Beach Outfit

used as a skirt, complies with all bathing beach regulations and Municipal laws and is sure to fit, as it has an adjustable size waist band. Used as a cape, it affords excellent protection from wind and sun. The figure shows how the article may be used as both skirt and cape, thus affording an attractive outfit.

It comes in red, green, blue and white—The Baumann Rubber Co., New Haven, Conn.

For the Joker

A sponge rubber pretzel, which is the same size as a real pretzel, and looks just like a real one, is one of the new novelties



Pretzel

on the market. It makes an excellent, harmless practical joke at card parties, banquets, conventions, food shows, etc. Manufactured by the Seiberling Latex Products Co., Akron, O.

Diver's Cap

The new Faultless diver's cap is charmingly different in shape and pattern. It has been designed particularly for young girls who want a cap that is the last word in style. The manufacturer claims that it is absolutely unlike anything else on the market. A surface embossing gives the cap the appearance of being covered by small overlapping feathers. A large variety of colors is offered which includes: red, blue, green, black, white, orange, straw and chestnut.—The Faultless Rubber Co., Ashland, O.

Bathing Cap

Safety Respirators

Cesco respirators are designed to protect the nose, mouth, throat and lungs from the inhaling of dust and poisonous fumes. The body of the respirators is made of aluminum, to which is fastened a soft molded rubber cushion. This cushion fits the contour of the face and enables the mask to be worn with comfort. Flutter valve releases all exhaled air and keeps the mask cool.—Chicago Eye Shield Co., 2300 Warren Ave., Chicago, Ill.

Cesco Respirator

Tire Capping Gum

Capping gum is three-ply calendered rubber stock cut of the right width and gage, with edges beveled at 45 degrees, to replace worn non-skid tire treads. No additional strips of gum are needed on the shoulders of the recapped tire. The gum is prepared in 6 different sizes to take care of every passenger car tire from 3½ to 7 inch and is put up in 25 pound rolls or it is furnished in any dimensions when ordered in 500 pound lots.

Capping gum is calendered with a smooth black glossy finish free from blisters or porosity and laminated to the gage desired. In this way a dense tough tread stock is obtained that has long wearing quality.

Recapped tires are greatly to be preferred to retreaded tires especially from the point of view of absence of trouble and consequent loss of service. The time to recap a tire is when the non-skid portion of the tread has worn away and plenty of smooth tread remains. At that time the original tread and breaker strip are undisturbed and reconditioning by application of the capping stock restores the tire as a perfect unit.

Recapped tires are much stronger than a tire that has had all the original tread cut off and a new tread and breaker strip vulcanized to a fabric carcass after having every particle of rubber removed from it in preparation for retreading.—United States Rubber Co., New York, N. Y.

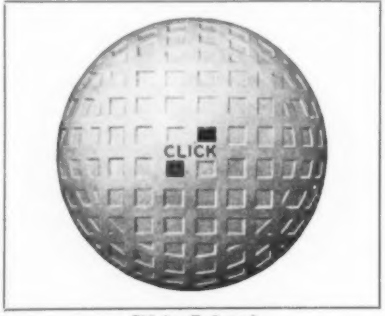
Rubber Cat

Baby Katnips is a dainty rubber puss just the right size for the little chaps and babies to play with and put through all his paces. It meows, rattles and makes faces when squeezed, rocks and bobs about but will not roll away out of reach of eager little hands. The ears are just right for the tiny tot to hold and shake him by. Katnips is easily washed with soap and water. The voice device does not rust. The cat is supplied in black or white, the latter especially dainty with its large blue eyes and round red mouth.—Katnips, Inc., 21 S. Main St., Providence, R. I.

Baby Katnips

Golf Ball

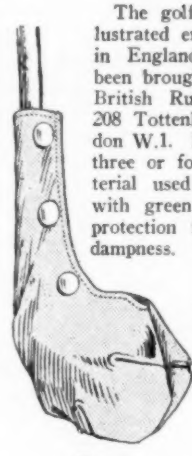
The 1929 Click Colonel golf ball has many improvements which will appeal to every golfer. A new, tougher cover insures enduring service and specially prepared paints keep the ball looking new and clean even after it has seen long service. Made by experts of the finest material obtainable, the balls are subjected to exhaustive laboratory and playing tests to insure reliability and endurance.—St. Mungo Mfg. Co. of America, 121 Sylvan Ave., Newark, N. J.



Click Colonel

Golf Club Cover

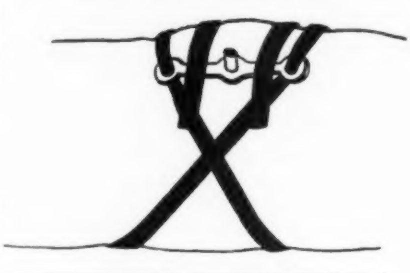
The golf club head cover illustrated enjoys great popularity in England where it has just been brought out by The North British Rubber Co., Ltd., 200-208 Tottenham Court Rd., London W.1. It is made with either three or four fasteners, the material used is rubberized, lined with green baize and forms a protection from rain, snow and dampness. It also protects the head from being knocked and scratched when not in use. The cover may be obtained for either a wood or iron club and comes in an assortment of colors.



Cover

Surgical Drainage Device

This invention relates to surgical drainage appliances, the general object being to provide means for holding the drain tube in the incision in such a manner that the wound can be easily inspected without removing the device and air can reach it without interference on the part of the device. A further object is to so form the device that it will not irritate the wound and to provide several holes therein, all of which or some of which can be used for holding drain tubes.



Drain Tube Holding Appliance

The appliance is formed of a strip of material, such as rubber, rubber and metal, or metal with an enlarged center and ends, an opening being formed in the enlarged center and openings in the enlarged ends. The walls of these openings are rounded and of slightly less diameter than the exterior diameter of the drain tube, so that when the tube is passed through one of these holes, it will be held by the device. The device is placed over the incision, with the end of the drain tube entering the incision and the device can be fastened in place in any suitable manner, such as by the use of tape which may be passed over portions of the device and, if desired, passed through the holes which are not used for holding the drainage tube.—Harry R. Cabral, 404 Chartres St., New Orleans, La.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country	Purchase or Agency
35,807	Tires	Alexandria, Egypt	Agency
35,808	Plungers	Stavanger, Norway	Agency
35,809	Belting	Halle, Germany	Agency
35,828	Belts without buckles	Batavia, Java	Both
35,845	Surgical supplies	Oslo, Norway	Purchase
35,922	Canvas top shoes	Lourenco Marques, Portuguese E. Africa	Purchase
35,941	Overshoes	Munich, Germany	Purchase
35,977	Tires	Budapest, Hungary	Agency
36,066	Footwear	Copenhagen, Denmark	Both
36,067	Toys, balloons and specialties	Buenos Aires, Argentina	Agency
36,069	Canvas and tennis shoes	Trieste, Italy	Purchase
36,076	Tennis balls and shoes	Plauen, Germany	Purchase
36,078	Tennis shoes	Munich, Germany	Both
36,084	Balls, accessories and tires	Milan, Italy	Purchase
36,088	Rubber products and raincoats	Milan, Italy	Agency
36,094	Boots, shoes and raincoats	Buenos Aires, Argentina	Agency
36,106	Belting	Helsingfors, Finland	Agency
36,191	Scraps	Milan, Italy	Agency
36,218	Balloons	Smyrna, Turkey	Either
36,219	500 black raincoats	Guatemala City, Guatemala	Purchase
36,220	Tires	Lourenco Marques, Portuguese E. Africa	Agency
36,231	Infants' pants and bibs	Buenos Aires, Argentina	Both
36,251	Surgical and dental goods	Sydney, Australia	Agency
36,292	Tires	Addis Ababa, Ethiopia	Purchase
36,369	Rubber goods	Bombay, India	Agency
36,371	Overshoes, canvas shoes, sundries and specialties	Milan, Italy	Agency
36,392	Crude rubber	Stockholm, Sweden	Agency
36,419	Boots and shoes	Strasbourg, France	Either
36,420	Transmission belting	Paris, France	Both
36,421	Tire casings	Chefoo, China	Purchase
36,422	Tires	Gazi Aintab, Turkey	Both
36,423	Tires and tubes	Guadeloupe, W. Indies	Agency
36,446	Tires	Hanoi, Indo-China	Both
36,450	Elastic bands	Peking, China	Both

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Number	Special Circulars
2202	The Use of Selected Budded Stock on Rubber Plantations in Netherland India.
2203	Rubber Invoiced to the United States Week Ended January 19, 1929.
2204	Crude Rubber News Letter.
2205	Tire Exporters' Weekly News Letter.
2207	Sundries and Specialties News Letter.
2208	Tire Exporters' Weekly News Letter.
2209	Footwear Exporters' Monthly News Letter.
2210	Rubber Invoiced to the United States Week Ended January 26, 1929.
2211	Crude Rubber Reexports from the United States; Month of December, 1928.
2212	Crude Rubber News Letter.
2213	Mechanical Goods Monthly News Letter.
2214	Crude Rubber Reexports from the United States Calendar Year, 1928.
2215	Rubber Invoiced to the United States During Week Ended February 2, 1929.
2216	Tire Exporters' Weekly News Letter.
2217	Imports of Belting for Machinery of Cotton or Other Vegetable Fiber and Rubber into the United States During the Calendar Year 1928.
2218	Imports of Druggists Sundries into the United States by Countries during the Calencar Year 1928.
2219	Imports of Hard Rubber Combs into the United States During the Calendar Year 1928.
2220	Imports of Other Manufacturers of Hard Rubber into the United States During the Calendar Year 1928.
2221	December Imports of Golf Balls into the United States.
2222	Crude Rubber News Letter.
2223	United States Consumption of Crude Rubber and Reclaimed Rubber During 1927.

Sunproof

Sunproof is an organic material that is now available for effectively retarding the checking or cracking of the surfaces of rubber goods by exposure to direct or indirect sunlight. Material of this sort is greatly to be desired by rubber goods manufacturers who can now not only accelerate their cures, and protect the deterioration of their goods against oxidation, but protect them from damage by suncracking.

The characteristics of Sunproof are summarized as follows: Color, pale lemon; form, granulated; melting point, 68°-78° C; specific gravity, 0.95; odorless; non-toxic; no effect on rate of cure; no effect on color of goods during or after cure; very little effect on plasticity of uncured stock; no bad effect on aging; three to five times as effective as the best grade of paraffine wax.

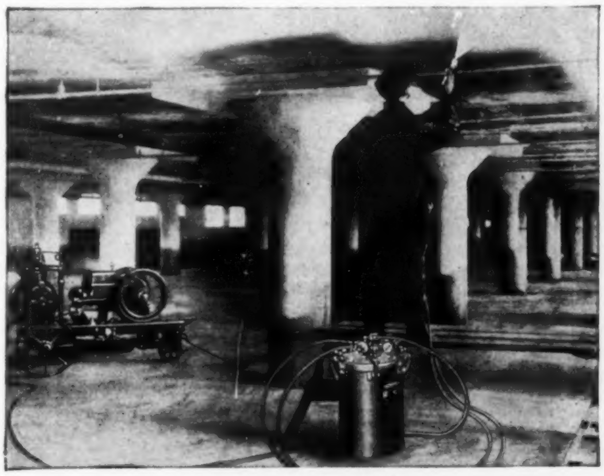
Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

Number	Inquiry
1202	Rubber horseshoe for indoor quoits.
1203	Sponge rubber silencer for water bucket.
1204	Rubber water novelties.
1205	Plastic rubber compound used for resoling rubber footwear.
1206	Manufacturers of rubber paving blocks.
1207	Information as to the use of magnesium oleate by rubber manufacturers.
1208	Manufacturers of rubber combs.
1209	Making monogramed rubber stamps.
1210	Perforated finger cot.
1211	Manufacturers of rubber cover for bridge table.
1212	Manufacturer of ten pound rubber brick for use in swimming pool tests.
1213	Information regarding the use of sheet rubber for moving picture screens.

Paint Spraying Outfit

There is not the great and continuous need of a paint spraying apparatus in the rubber industry that is found in the automobile or furniture industries. Yet many rubber plants are sufficiently extensive to utilize profitably a portable paint spraying equipment



DeVilbiss Paint Sprayer

for keeping the interiors bright and clean. Such an outfit is here illustrated employed in just such work.

The principal items comprised in the equipment are the gas engine or electric motor driven air compressor, and air receiver with safety valve and pressure gage; the portable paint tank in a variety of sizes with complete regulating devices; the spray gun and the air and fluid hose. The compressing outfit for factory painting is mounted on a small truck while the paint tank can be placed convenient to the work and is easily moved about as the operator requires.

In addition to these necessary items of equipment there are other accessories which facilitate the work and enable the operator to meet varying conditions.—The De Vilbiss Co., 236 Phillips Ave., Toledo, O.

Automobile Production

January production (factory sales) of motor vehicles in the United States, as reported to the Department of Commerce, was 402,154 of which 350,617 were passenger cars and 51,537 were trucks, as compared with 233,907 passenger cars and trucks in December and 231,728 in January, 1928.

The total figures for the year 1928 were 4,358,150 of which 3,827,260 were passenger cars and 530,890 trucks.

Financial and Corporate News

Akron Rubber Stock Quotations

February 18, 1929

Company	Bid	Asked
Akron R. R.	20	22½
Akron R. R., pfd.	...	95
Falls	8	10
Faultless	36	37
Firestone	230	235
Firestone, 6% pfd.	109⅝	110
Firestone, 7% pfd.	107¾	109½
General	251	260
General, 6% pfd.	101	101½
Goodrich	87	88
Goodrich, pfd.	103¾	104¾
Goodrich, 6½s	107½	107¾
Goodyear	110½	120½
Goodyear, 1st pfd.	102¾	103¼
Goodyear, 5½s, 31	99	100¼
Goodyear, 5s, 57	92	92½
India, com.	65½	66
India, 7% pfd.	...	95
Miller	22	23
Miller, 8% pfd.	76	82
Mohawk	58	59
Mohawk, 7% pfd.	87½	90
Rubber Service	...	40
Seiberling	51	53
Seiberling, 8% pfd.	107	108½

New York Stock Exchange Quotations

February 19, 1929

Company	High	Low	Last
Ajax	9¼	9⅛	9⅛
Fisk	16½	16¼	16½
Goodrich (4)	91¾	90	91
Goodrich, pfd. (7)	114⅝	114⅝	114⅝
Goodyear	124¼	122	122
Intercontinental	12¾	11⅜	12
Kelly-Springfield	18⅞	18½	18¾
Kelly-Springfield, 6% pfd.	95⅛	95⅛	95⅛
Lee	19½	19⅛	19⅛
Norwalk	5⅞	5½	5½
U. S. Rubber	49	48	48⅛
U. S. Rubber, 1st pfd.	81¾	81	81

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Boston Woven H. & R.	Com.	$1.50 q.	Mar. 15	Feb. 23
Firestone	6% Pfd.	$1.50 q.	Feb. 15	Feb. 1
Goodrich	Pfd.	$1.75 q.	July 1	June 10
Goodyear	Pfd.	$1.75 q.	Apr. 1	Mar. 1
Goodyear	1st Pfd.	$1.75 q.	Apr. 1	Mar. 1
Hood	Pfd.	1¾% q.	Mar. 1	....

Goodyear of Canada

The long projected split in the common shares of the Goodyear Tire & Rubber Co. of Canada, Ltd., is thought to be nearer than was anticipated. As a consequence the stock recently moved up precipitately from $200 to $300. It is believed that the split will be four for one. The company is said to be earning between $25 and $30 per share on the present stock.

Goodyear Tire & Rubber Co.

Goodyear Tire & Rubber Co., Akron, O., earned $13,327,843 during 1928, and net sales of $250,769,209 for the year are the highest yet recorded by the company. This profit is equal to $7.30 per share of common after $5,596,000 has been paid on the preferred and $9,474,000 deducted for depreciation, taxes, interest, etc.

President P. W. Litchfield announced at the directors' meeting that "no merger of rubber companies to which Goodyear would be a party is in contemplation and no discussion of such mergers by officials of the Goodyear company are going on, notwithstanding various rumors to the contrary."

Goodyear common stockholders may participate in a new issue of common stock to be offered very shortly and made available to all stockholders of record of February 21. Provisions of the offer stipulate that the stock will be distributed pro rata to existing shareholders of the Goodyear company at the rate of three new shares for each ten shares now held, and the price will be $80 per share.

Mohawk Tire & Rubber Co.

Net earnings of the Mohawk Tire & Rubber Co., Akron, O., for the past year amounted to $766,040 before reductions for federal income tax. During the year the company paid off its past due and accrued preferred dividends, as well as $50,000 worth of notes. President S. S. Miller stated that continuation of earnings at a rate comparable with the earnings of last year should hasten the time when the company's directors will consider the payment of dividends on the common stock. The company has no bank indebtedness or contingent liability and has $2,364,000 current assets to pay current liabilities of $412,000. Its relation of current assets to current liabilities is approximately six to one.

India Tire Passes Dividend

India Tire & Rubber Co., Akron, O., recently omitted the payment of the regular 7 per cent cumulative preferred dividend. This action was made necessary due to the impairment of earned surplus because of reserves set aside for adjustments of inventory on raw material.

New Incorporations

Century Tire & Rubber Co., Dec. 21 (Delaware), capital stock 50,000 shares preferred, par value $25, and 80,000 shares common without nominal or par value. E. E. Craig, A. L. Raughley, and M. S. Cook, all of Dover, Del. To manufacture and deal in rubber and rubber goods.

Dexter Rubber Corp., Jan. 22 (Delaware), capital stock 1,000 shares without nominal or par value. H. C. Hand, M. A. Castaldi, and H. B. Davis, all of 150 Broadway, N. Y. To manufacture and deal in rubber and rubber goods.

German American Rubber Co., Inc., Jan. 24 (New York), $25,000. M. Filiurin, 215 E. 12th St., F. G. Farland, 1141 Broadway, and S. Reider, 1892 Marmion Ave., all of New York, N. Y. Principal office, Manhattan. Rubber in all forms.

King Innovations, Inc., Feb. 18 (New York), capital stock 750 shares, par value $100 and 100 shares common no par value. J. Cohen, A. Burkes, both of 119 W. 25th St., and G. G. Rona, 188 E. 75th St., all of New York, N. Y. Principal office, Manhattan. Rubber, gutta percha, etc.

Thermoid Company., Jan. 28 (Delaware), capital stock 20,000 shares at $100 each and 600,000 shares without nominal or par value. A. V. Lane, C. S. Peabbles and L. C. Gray, all of Wilmington, Del. To manufacture rubber goods.

Additional Cut Made in Tire Prices

A cut of from 2½ to 10 per cent on prices to dealers was made last month by the leading tire manufacturers. Announcement of this reduction, the second since October, was first made by The B. F. Goodrich Co., and followed by the Goodyear company. The cut was expected because of reductions of 7 to 20 per cent in tire prices in December by the Chicago mail order houses.

The revised schedules brought 2½ to 5 per cent reductions on standard and balloon sizes used on Ford and Chevrolet models and similar reductions on many sizes for larger cars. The cut was as high as 10 per cent on certain sizes of cord tires. The tire companies announced one advance in tire prices, along with the reductions.

Conditions in the tire industry are said to continue on a firm basis with an unusually high level of production for this time of the year. Car manufacturers' current orders continue to average from 50 to 75 per cent greater than a year ago.

Eminent Leader

In the rubber industry's future hall of fame none of its great leaders is likely to be accorded higher place than that remarkable American, Harvey Samuel Firestone. With a rare combination of executive talents, broad sympathies, uncommon vision and initiative, he is acknowledged by other great captains of his chosen industry as the most forceful figure in the trade at home and abroad.

Underwood & Underwood Studios

HARVEY S. FIRESTONE has just turned three-score of years, having been born Dec. 20, 1868, on a farm near Columbiana, O., the son of Benjamin and Catherine Firestone. Finding his bent more commercial than agricultural, his parents wisely encouraged this leaning by giving him a high school and business college training. After graduating he got his first taste of business while a bookkeeper for a coal dealer, John W. Taft, a distant relative of former President Taft, in Columbus. He might have developed into a coal instead of a tire magnate were it not that while demonstrating the merits of a rubber tired buggy in Detroit he was impressed with the worldwide need of rubber rimmed vehicular wheels. The idea so engrossed him that he at once raised a little capital, and as head of the Victor Tire Co. began in 1896 to make rubber tires and tired wheels in Chicago. The output grew fast and four years later he was induced to sell the business at a fine profit.

The year 1900 marked an epoch in the career of Mr. Firestone. It was then that, foreseeing the city's importance as a rubber center, he decided to go into the making of tires in Akron. The start was modest, but so well did he plan and work, that his little made-over machine shop with its seventeen workers eventually developed not only into a gigantic plant in Akron, but an international industrial chain that includes a half dozen great rubber factories, colossal cotton mills to serve tire and footwear shops, rubber conditioning plants and warehouses in the tropic Far East, direct steamship lines, an immense rubber plantation in Africa, and an unsurpassed organization for marketing the huge outturn of Firestone products.

A very human industrialist, Mr. Firestone was early interested in workers' welfare, and not only built a model home community near the parent plant, but gave the operatives a handsome clubhouse, an athletic field, a 36-hole golf course, organized a savings bank with special advantages, and established such a model stock-owning plan that when it was announced a dozen years ago 11,300 out of 13,000 employes showed their faith by promptly subscribing for most of the 50,000 shares issued.

During the World War Mr. Firestone not only put the extensive Firestone Park property at the service of the federal government, but subscribed heavily for Liberty Loan bonds and strove hard for the success of the several great loan drives. He was a member of the Ohio Council of National Defense and rendered especially valuable aid as a member of the United States War Service Committee of Eight in regulating the importation and allocation of crude rubber and also in organizing the Rubber Division of the War Industries Board.

That Mr. Firestone had the larger interests of the rubber industry at heart, quite as much as his own, was strikingly shown in his fight against the Stevenson Restriction Act which took effect Nov. 1, 1922. A notable feature of his campaign against the attempt to control the price of crude rubber was his calling of the conference in Washington, Feb. 27-28, 1923, of all rubber, automobile and accessory manufacturing companies of the United States to consider ways and means for obtaining rubber from other than the British restricted sources. He was directly instrumental in getting the federal government to carry out its world-wide investigation of the crude rubber situation and its inquiry into potential production of rubber under American auspices. In addition to the government expeditions, he fitted out one of his own to gather additional data on rubber production in both hemispheres.

Realizing the advantage to a manufacturer in controlling the source of raw materials, Mr. Firestone set about to acquire a rubber plantation adequate for his companies; and in the summer of 1925 he announced that in Liberia he had finally realized his wish through a concession there of a million acres. Starting with a small estate as a nucleus, he is rapidly developing on African soil, and under the immediate direction of his eldest son, Harvey S. Firestone, Jr., a plantation which will be the last word in equipment and efficiency.

Business may be to him like an activating mainspring, but, practical as he is, Mr. Firestone is intensely human. No employer takes a kindlier interest in or is more appreciative of his hosts of coworkers or knows so many of them intimately. To his quick and direct sympathy may be fairly attributed the fact that they are so thoroughly imbued with the Firestone spirit of loyalty. Early realizing the advantages of freedom from capital control by outside interests, Mr. Firestone has so wisely regulated the financing of his concerns that the dominant voice is always that of himself and his faithful fellow-workers. Without such handicap of external influences, his friends say, he is better able to realize his cherished ambition of "utmost success through maximum service."

Probably the most striking characteristic of Mr. Firestone is his ability in formulating or executing a plan, to concentrate unremittingly upon it. Nothing appears to distract him, and when he has finished weighing a business proposition his friends say there is very little left to consider.

Asked once what factor had exerted the most favorable influence on his career, Mr. Firstone said: "I attribute any success I may have had to the fact that at the beginning I had no capital. Then I had to watch every expenditure. Men fail, I believe, because they have no goal and work aimlessly in life. Every successful man has a definite aim, and his efforts are given over to accomplish that end."

In addition to being the head of the Firestone Tire & Rubber Co. of Akron, O., and Los Angeles, Calif., Mr. Firestone also heads the tire factory bearing his name in Canada and is a director in the Firestone Tire & Rubber Co. (Great Britain) Ltd. He is also president of the Firestone Steel Products Co., and the Firestone Park Trust & Savings Bank, Akron Home Owners' Investment Co., Coventry Land & Improvement Co., and the Xylos Rubber Co. of Akron; director of the Bankers' Guarantee Title & Trust Co. and Central Savings & Trust Co. of Akron; member of the Chamber of Commerce of the United States, Highway Education Board, John Burroughs Memorial Association, New England Historical and Genealogical Society, Ohio Society of New York, president of the Akron City Planning Commission, member of the Ohio Council of Churches (president 1923-4).

Mr. Firestone was long an active member of the Rubber Association of America and while president (1916-18) entertained the directors and standing committees at his estate "Harbel Manor," Medina Rd., Akron. He was one of the organizers of

the Rubber Institute, Inc., and helped to form the Rubber Purchasing Agency. In 1926 he was honored by Mt. Union College with the degree of Doctor of Business Administration. He is a member of the Society of Automotive Engineers, Akron Chamber of Commerce, Akron Real Estate Board, of the University, City, Portage Country, and Fairlawn Country clubs, Akron; Union and Mayfield Country clubs, Detroit; India House, New York; and Congressional Country club, Washington.

To encourage the building of better roads and improving transportation, Mr. Firestone offers yearly to high school students a 4-year college scholarship for the best essay on the subject. His hobbies center about fine horses, prize cattle, model farms, and dairying. At his Akron estate he maintains one of the finest private riding rings in the country. At Miami Beach, Florida, he maintains another estate, Harbel Villa.

Mr. Firestone married Miss Idabelle Smith, daughter of Mr. and Mrs. George T. Smith, of Jackson, Mich., Nov. 20, 1895. Mr. and Mrs. Firestone have six children: Harvey S., Jr., efficiently managing the Liberian plantation; Russell Allen, who will have charge of the new Firestone tire factory in Los Angeles; Leonard Kimball, a student at Princeton; Raymond Christy, who is preparing for Princeton; Roger Stanley, and Elizabeth Idabelle.

Annual Meeting of Northern Rubber Co.

Northern Rubber Co., Barberton, O., at its annual meeting elected the following directors: L. J. Schott, Edmund Shaw, F. M. Howard, Dr. A. A. Kohler, C. Blake McDowell, E. M. Hahn, Louis Schott, T. H. Clark, J. I. Bower, F. W. Siffert, J. P. Immler. L. J. Schott was reelected president; Edmund Shaw, treasurer; and H. H. Hilton, assistant treasurer. E. M. Hahn was elected secretary to succeed Owen Monahan.

Business, it was reported, exceeded $1,000,000 during the year, with $1,500,000 anticipated for the coming year.

The Akron Section of the A. C. S. met February 20 in the general office dining room of the Goodyear Tire & Rubber Co. and was addressed by Dr. G. S. Whitby on the subject of "Elastic Colloids." Dr. Whitby is professor of chemistry at McGill University, Montreal, Canada, and is considered one of the outstanding authorities on rubber.

A. J. Fleiter, vice president and general manager of the Akron Standard Mold Company of Akron, Ohio, recently returned from a business trip to the West Coast. Mr. Fleiter visited rubber companies in the San Francisco rubber districts.

Ohio

Williams F. & M. Merged with National Foundry

The Williams Foundry & Machine Co. Akron, Ohio, has been purchased by the National Foundry Co., Erie, Pa. The following officials of the National company will operate the new company. E. W. Sheldon, president; A. H. Willis, general manager and treasurer; A. W. Reichert, secretary and sales manager.

W. Y. Duncan will continue as sales manager of the Rubber Mill Machinery Division of the National company.

Edward E. Allen & Son will continue with the new company in the manufacture of Allen-Williams products including tubings and straining machines, also they will develop a complete line of rubber machinery.

The new company will immediately erect at Erie, Pa., a machine shop building of the most modern type, 150 feet wide by 350 feet long, equipped with three overhead 15 to 30-ton cranes, and with complete machine tool equipment, on adjacent property to the present foundries and gear plant. The buildings will then comprise a 15-acre site with sidings on three railroads, New York Central, Nickel Plate and Bessemer & Lake Erie, with direct switching connection with the Pennsylvania Railroad.

The present plant of The Williams Foundry & Machine Co., in Akron, O., will be operated until the new Erie plant is in operation, which will be about June 15, 1929. Business will continue without interruption and all existing orders carried through on schedule. The present personnel of The Williams company, with the exception of the officials, will continue with the new company.

The Mohawk Rubber Co., Akron, O., directorate was reduced from eight to five members at the annual executive conference held Feb. 12. The directors who will serve during 1929 are S. S. Miller, president; J. F. Jones, J. B. Huber, E. J. Smail, Jr., and R. M. Pillmore. All officers were reelected. They include J. B. Huber, vice president; J. F. Jones, vice president in charge of sales; R. E. Block, vice president in charge of finance; H. H. McCloskey, secretary and H. H. Matz, treasurer.

Charles M. Piper, sundry sales manager of the Goodyear Tire & Rubber Co., has recently announced his resignation to take effect March 1. Mr. Piper came to Goodyear in March, 1915, and has worked successively in the service departments of the company at Akron, Minneapolis and Chicago.

Patrick H. Hart, treasurer of the Goodyear Tire & Rubber Co., Akron, O., since 1920 has tendered his resignation. He first became identified with the Goodyear company in 1920, and previously was connected with Price, Waterhouse & Co., accountants of New York, N. Y., and had been also a consultant in railroad construction work in Canada.

The Harshaw Chemical Co., formerly The Harshaw Fuller & Goodwin Co., manufacturers and importers of chemicals, oils and dry colors, has elected new officers. W. N. Harshaw is president, R. S. Wensley, W. J. Harshaw, O. J. Hall and W. R. Wensley are the vice presidents and Drake T. Perry is secretary and treasurer. Factories of the company are located at Cleveland, Elyria, and Philadelphia. The principal office is in Cleveland and there are branch offices in New York, Philadelphia and Chicago. The company has agencies in most of the larger cities of the country.

The Goodyear Tire & Rubber Co., Akron, O., announces that P. E. H. Leroy, former assistant treasurer of the company, has been appointed treasurer to fill the vacancy made by the resignation of P. H. Hart. The directors of the company also advanced Hubert H. Hanna and Zimmri C. Oseland to the positions of assistant treasurers.

P. E. H. Leroy

J. C. Clinefelter of the sales department of the Akron Rubber Mold Division of the National Rubber Machinery Co., Akron, Ohio, has been confined to St. Thomas Hospital on account of a broken leg.

The Swinehart Tire & Rubber Co., Akron, Ohio, has purchased the business and part of the equipment of the Erie Rubber Corp. of Sandusky. J. A. Miller, general manager of the Erie Rubber will join the sales force of Swinehart.

Reorganization of Mason Company

Bondholders have completed their reorganization of the Mason company and will function under the name of The Mason Tire & Rubber Corp. It is stated that tires will be ready for the market on, or before, March 1, and that the Kent, O., plant will be put in operation at once. The company will concentrate its efforts on one line of high quality tires only and will sell its product on an exclusive distributer basis.

Henry Garrison Keller, president of the new company, is a Pennsylvania graduate. He has had considerable experience in the management of manufacturing plants and the study of market conditions. One of the first plants in England to manufacture roller bearings was designed, equipped, and managed for some time by Mr. Keller. In recent years he has been associated with Ford, Bacon & Davis, New York, and Ralph E. Davis of Pittsburgh in the valuation of public utility and industrial plants, also in the study of markets and market conditions for proposed utilities.

H. G. Keller

The new company will have its first meeting of distributers March 1, 1929, at which time the sales policy will be discussed.

Protagonist of Guayule Rubber

To all familiar with rubber history the mere mention of guayule at once suggests George Holmes Carnahan. The name of the product and that of its practical promoter have become in a way synonymous, so long and so intimately have the two been associated. Certain it is that no one has labored against more discouraging odds and few have expended as much to vindicate the basic soundness of an important industrial development than has Mr. Carnahan. In his bright lexicon there seems to be no such word as fail. While many were scouting the idea that the United States could develop within its own confines an abundance of good rubber, he labored on indefatigably, convinced that it could be done at competitive cost if the work were carried on in a thoroughgoing fashion. At last his long-cherished plans are maturing in a gratifying manner, and America's fears of a rubber scarcity are being gradually dispelled largely through the unique enterprise which he initiated and so valiantly championed.

But while the rubber trade knows of Mr. Carnahan as the foremost figure in the development of guayule, it is not as familiar with his career as a geologist, expert engineer, trade authority, and financier, or with his talent for organizing. Like many another business leader who has won high place, he is of Scotch-Irish descent and was born in Cadiz, O., March 16, 1879, and supplemented a high school education with special courses in inorganic chemistry and metallurgy. Early showing an aptitude for engineering, he turned a practical training in that line to good account. Between 1896 and 1902 he acquired experience with mining companies in Leadville, Col., Mexico, and Ecuador to qualify for appointment in 1903 as general superintendent of mines for the Cia. Metalurgica Mexicana, retaining that position until 1910 when he became manager of the mines, mills, and smelters of the Tezuitlan Copper Co., Mexico.

Mr. Carnahan having made a close study of rubber generally and the possibilities of its large scale production near its greatest market, became actively interested in guayule operations while in Mexico. In 1915 he gave up his extensive and successful mining interests to accept the presidency of the Continental-Mexican Rubber Co. and shortly afterward was made president and chairman of the board of the Intercontinental Rubber Co., which, with its subsidiaries, has been the largest producer of guayule rubber since 1906. Intercontinental has also developed a large hevea rubber plantation in Sumatra following a personal inspection by Mr. Carnahan in 1917.

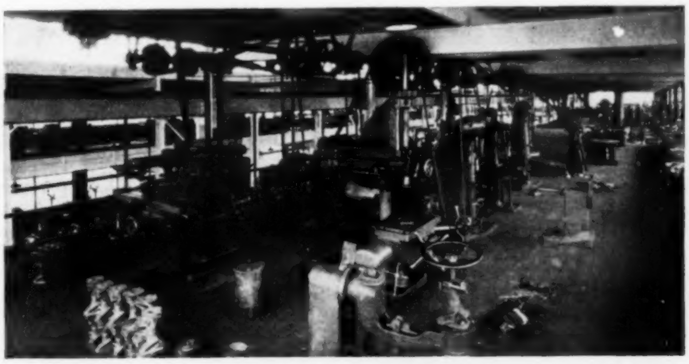
Blank-Stoller, Inc.

George H. Carnahan

Largely through Mr. Carnahan's engineering and organizing talent guayule rubber has retained an important place in the industry with a 1927 production of 12,000,000 pounds which placed it second on the list of several hundred plants containing rubber. In 1926 at a Rubber Division symposium of the American Chemical Society in Philadelphia he read a paper, since widely quoted, on "The Production of Guayule Rubber," forecasting guayule raising on an extensive, mechanized scale by farmers guided and financed by local factory organizations. He has also invented and patented many devices and processes for extracting rubber from guayule shrub, as also nitrate from Chilean ores.

Mr. Carnahan is also president and chairman of Intercontinental's several subsidiaries. He was married to Miss Lucretia Butt on April 29, 1913, and makes his home at 20 East 76th St., New York. He is a member of the Lotos Club, New York Athletic Club, New York Rubber Exchange, American Geographical Society, Sons of the American Revolution, American Chemical Society, Explorers' Club, and La Jolla Golf Club. His office is in the General Motors Bldg., 1775 Broadway, New York.

Wolfgang Klemperer, expert of the Goodyear Zeppelin Corp. staff will be in charge of the initial course of the Akron University ground school in aviation, scheduled to open March 1. Aerodynamics will be the first course and it will be taught as a part of the evening session of the school.



LIGHT MACHINE TOOLS ON EASTERN MEZZANINE FLOOR OF NATIONAL RUBBER MACHINERY CO.'S DE MATTIA BROS. PLANT AT CLIFTON, N. J.

New England

The Fisk Sales School has been developed by The Fisk Tire Co., Inc., Chicopee Falls, Mass., with the idea of giving the sales organization a definite and comprehensive knowledge of the company's product and policy. The plan involves a two weeks' course, three days in factory inspection and lectures by department heads on the processes visited during the inspection trips, followed by four days of real bench experience in the repairing of tires and the use of up-to-date repair equipment, four days to selling and advertising study and one day to an examination.

The Boston Woven Hose & Rubber Co., Boston, Mass., has taken title, through James J. Scully, in the large manufacturing plant bounded by Broadway, Hampshire St., Boston & Albany Railroad and the Broad canal, Cambridge, Mass. This plant consists of three buildings three stories high containing 63,000 feet of manufacturing space. A large power plant and 76,741 feet of land are included also. J. J. Newton Smith of Salem is president and manager of the Boston Woven Hose & Rubber Co., one of the oldest of New England's enterprises in the rubber trade.

The United States Rubber Club, composed of officials of the U. S. Rubber plants and offices in the state, held its first banquet recently at the Boston City Club which took the form of a reception to the new president of the corporation, F. B. Davis, Jr. of New York. E. B. Robinson, superintendent of the American Rubber Co., president and Homer E. Sawyer, formerly of Malden and vice president of the United States Rubber Co., introduced President Davis.

George B. Hendrick was elected president and general manager of Footwear Guild, Inc., at the first meeting of the Guild directors. The election marked the consummation of an idea started nine months ago which will lead to an entirely new method of distribution of shoes from the manufacturer to the consumer through the retail dealer, and the final move before a start of a $1,000,000 corporation which has been organized by The Sherman Corporation, engineers and business managers. Mr. Hendrick is widely known in Massachusetts having previously held an executive position with the Fisk Rubber Co. of Chicopee Falls.

Walter Wakefield has been made manager of the production department of the Clifton Manufacturing Co., Jamaica Plain, Mass. He was formerly connected with Converse Rubber Shoe Co., Malden, Mass.

N. Lincoln Greene, president of the Clifton Manufacturing Co., Jamaica Plain, Mass., makers of rubber clothing, tapes, hockey pucks, etc., is on an extended business trip to the Pacific Coast.

The Stedman Products Co., South Braintree, Mass., makers of Stedman naturized reinforced rubber flooring, elected the following officers at their annual meeting February 19: Herbert O. Phillips, president; Merton A. Turner, first vice president; Walter W. Rowse, second vice president; James I. Finnie, treasurer and George W. Bailey, secretary. Reports submitted indicated that the Company had made substantial progress financially, with increased sales.

J. & W. Jolly Inc., machinists of Holyoke, Mass., who make automobile tires and tube machinery are manufacturing special machinery for the Fisk Rubber Company from Fisk designs and patents.

Rhode Island

The mild winter is reflected in the rubber boot and shoe factories in Rhode Island, the plants all being on curtailed schedules both as to the number of operatives and the production cards. Prospects of activity are not promising for some time to come. The wire departments, on the other hand, are working normally while the novelty and druggists' sundries departments are operating full time with good orders ahead.

The American Wringer Co., Woonsocket, sold its hand clothes wringer department to the Lowell Manufacturing Co. of Erie, Pa., for a price which was not disclosed. The machinery of the department was transferred to the Erie plant of the Lowell company. George R. Kelite, secretary and general manager of the Woonsocket company, stated that the sixty people who comprised the hand wringer department would be taken into the other departments as they expand from time to time.

Clarence W. Higbee, former technical superintendent of the wire division of the National India Rubber Co., at Bristol, was tendered a farewell banquet by members of the Bristol Engineering Society the evening of Feb. 15, with A. S. Bazilevich officiating as toastmaster. Addresses were given by S. A. Smith of Brooklyn, N. Y., L. Leo Cantwell, superintendent of production of the wire division of the local factory and Edward A. Maher, who has recently returned from Persia, where he was employed as a constructing engineer.

The United States Rubber Co. has announced the appointment as assistant manager of the mechanical sales department of J. A. Wahlgreen who was formerly with the National India Rubber Co. at Bristol. Clarence W. Higbee who has been technical superintendent of the wire division of the National India Rubber Co. has been promoted to assistant manager of wire sales of the United States Co. Promotions in the National plant include Fred L. Dunbar, from operating superintendent to a consulting capacity; A. S. Bazilevich from chief inspector to technical superintendent, succeeding Mr. Higbee, and L. Leo Cantwell to production superintendent.

Fisk Sales Conference

Officials of the Fisk Tire Co., Inc., Chicopee Falls, Mass., started a series of district sales meetings, Feb. 4 and 5, in Atlanta, Ga., which will extend throughout the entire country ending at the Hotel Kimball, Springfield, Mass., Mar. 13 and 14.

The group is headed by Frank E. Espenhain, executive vice-president, and its purpose is to outline to the sales organization the 1929 plans for the Fisk company including the advertising program and the dealer help plans.

Bankers Buy Thermoid Rubber and Stokes Asbestos Co.

The Thermoid Rubber Co. and the Stokes Asbestos Co., both of Trenton, N. J., have been purchased by a syndicate of New York bankers. The companies will be operated with an interlocking management.

Robert J. Stokes, president of the Thermoid Rubber Co. and treasurer of the Stokes Asbestos Co., made the announcement, but declined to reveal the identity of the purchasers or the price involved.

Outstanding capital stock of the two companies has changed hands and a holding company is now in process of formation. It will be called the Thermoid Company and is to control the operating companies here as subsidaries.

Officers of the Thermoid Rubber Co. and the Stokes Asbestos Co. will be included in the holding company and the present management of the two companies will remain the same with one exception. That is, Robert J. Stokes in addition to being treasurer of the asbestos company, will become president as well, succeeding his father, W. J. B. Stokes. According to plans, both plants which employ 800 people, will remain in operation.

Officers of the Thermoid Rubber Co. will be, as they have been heretofore, Robert J. Stokes, president; Joseph O. Baur, secretary-treasurer. Mr. Baur will also continue as secretary of the Stokes Asbestos Co. Mr. Stokes will act as general manager.

The Thermoid is one of the largest companies making brake lining in the United States and is the largest of all American concerns manufacturing hydraulic compressed brake lining. It maintains agencies in all parts of the world and numbers among its customers some of the biggest users of brake lining. In addition to brake linings, it makes clutch facings, mechanical rubber goods, moulded specialties, universal joint disks and auto radiator hose.

Eastern and Southern

Joseph A. McNulty, 114 Liberty St., New York, N. Y., importer of red oxide has been appointed a member of the Committee on Chemicals of the British Empire Chamber of Commerce in the United States.

Haldane & Co., Inc., announces the removal of its offices to the Corn Exchange Bank Bldg., 15 William St., New York, N. Y.

H. Hentz & Co., New York, N. Y., has, through the election of Sylvan E. Weil as a member of the New York Stock Exchange, two representatives on the exchange, the other being H. N. Baruch. Mr. Weil who was manager of the rubber department of the firm was admitted to partnership last year.

Carlye Rubber Co., dealers in rubber goods are now located in larger quarters at 64 Park Place, New York, N. Y.

National Association of Waste Material Dealers, Inc., will hold their annual meeting and banquet at the Congress Hotel, Chicago, Ill., March 20.

The New Jersey Zinc Sales Co.'s manager of sales development, Bruce R. Silver, spent several days in Akron last month. Before being advanced to his present executive post in New York, Mr. Silver was located in the Cleveland office of the company.

Stewart-Mathesius, Inc., personnel agency has removed to 247 Madison Avenue, Suite 601. Frank Y. Stewart is president.

Cutler-Hammer, Inc., Milwaukee, Wis., announces that it has acquired the business of the Trumbull Vanderpoel Electric Mfg. Co. of Bantam, Conn., which will be operated as a subsidiary under its present name.

J. M. Huber, Inc., 460 W. 34th St., New York, N. Y., has recently started the construction of a large new carbon black factory in the Panhandle of Texas, located two miles west of Borger. The plant is designed to produce approximately fifteen million pounds of carbon black per year.

Goodyear Tire & Rubber Co., Akron, O., has named five key men to be in charge of production at the new Goodyear plant being constructed at Gadsden, Ala. These men are: V. L. Follo, who will be superintendent of division A; Norman A. Neiger, who will be superintendent of division B; G. G. Bloon, who will be in charge of division C; Jack M. Fry will be development manager; and Patrick Niederhauser, who will have charge of technical service.

The McClaren Tire & Rubber Co., Charlotte, N. C., has announced the beginning of quantity production of a new extra heavy tire known as the McClaren autocrat universal balloon. Additional equipment installed in the plant for its manufacture will increase production approximately 25 per cent. The company has on file orders for about 90 per cent more tires than on the corresponding date of 1928.

The Old Dominion Rubber Co., Inc., 600 Nat. Bank Commerce Bldg., Norfolk, Va., has recently undergone a reorganization. The plant has been improved and is now ready to put on the market a toy balloon. Officers of the company are: J. R. Young, president; John Hadfield, vice president and general manager; R. G. Young, secretary and treasurer. Directors are: H. W. Lyon, Barron S. Black, J. R. Young, R. G. Young and John Hadfield.

Goodyear Tire & Rubber Co. announces $600,000 is to be spent in improvements for increasing the capacity of the fabric mills at Cedartown, and Thomaston, Ga. This is said to be the largest single cotton mill development in the south since the Civil War. The company plans to add 18,800 spindles, bringing the total number of spindles at Cedartown plant to 50,800 and the plant at Thomaston will be increased to 80,000 spindles. The mills will have a capacity of 15,000,000 pounds of fabric annually. New buildings are to be built.

Dr. Charles F. Swingle of the Department of Agriculture, recently returned from Madagascar bringing live plants and seeds, which will be tested for possible adaptation in the United States, the Department of Agriculture stated February 15. In the collection are 23 lots of plants which seem to be potential sources of rubber. Ten of these plants are being commercially exploited for rubber at the present time in Madagascar, Dr. Swingle says.

New Jersey

Production in the New Jersey rubber plants is reported to be generally normal, but having dropped off a little in some of the factories. A few plants working on large midwinter rush orders were compelled to operate with three shifts. Now that these orders have been filled the overtime has been eliminated. Orders for tires and tubes are slowly increasing and spring prospects are very good. Hard rubber orders also show some improvements and sales of heels and soles are increasing. Belting, packing hose lead in the production of mechanical rubber goods.

The Vulcanized Rubber Co., Morrisville, Pa., continues to operate under normal working conditions.

The Murray Rubber Co., Trenton, N. J., announces that conditions in all lines of rubber production show some improvement. The company is operating normally.

The Joseph Stokes Rubber Co., Trenton, N. J., reports that the hard rubber situation is improving. The company is preparing to take care of its increasing business by the installation of new equipment.

William J. B. Stokes, prominent Trenton rubber manufacturer, and Mrs. Stokes are sojourning in St. Augustine, Fla.

The Pierce-Roberts Rubber Co., Trenton, N. J., is now operating to capacity and is occupying its new addition, where rubber molded goods are manufactured.

The Mercer Rubber Co., Hamilton Square, N. J., reports that business shows some improvement over the past two months.

William H. Sayen, Jr., president of the Mercer Rubber Co., Hamilton Square, N. J., is on an extended business trip through the West and Northwest. He will be absent a month.

The Hamilton Rubber Manufacturing Co., Trenton, N. J., announces the appointment of three new representatives for the Victor-Springfield tires and tubes. G. M. Youngkrantz, of Chicago, has been made district representative for that section. H. R. Smith, of Columbus, O., will look after the territory in Ohio, Indiana, Kentucky and West Virginia. Harold Bell, of Dallas, Texas, will cover the southwestern territory.

The Combination Rubber Manufacturing Co., Trenton, N. J., announces that business has slackened up a little. The company had been operating twenty-four hours a day for some time.

The Whitehead Bros. Rubber Co., Trenton N. J. manufacturers of mechanical rubber goods, report a new addition to the factory with a railroad siding will be completed early this month. The mill and calender room will occupy the first floor and the hose making department the second floor. A total of 6,800 square feet will be added.

Rubber Products Corp.

The Rubber Products Corp., a New Jersey corporation organized last September, has purchased the large factory building of the former Rubbercraft Corp., Doylestown, Pa., and has started operation. New equipment has been installed and the firm is now manufacturing high grade molded goods and full molded automobile inner tubes. Golf ball centers are also being made by the new company as well as a full line of rubber washers and joints for milking machines and other apparatus. Fifty per cent of the product made by the concern is sold to manufacturers of other articles using rubber and the balance to the jobber. William C. Ehrenfeld, formerly of the Dural Rubber Co., Flemington, N. J., is business manager of the new concern.

Pacific Coast

A. H. Gregory, San Francisco branch manager of New York Belting & Packing Co., one of the best-informed distributers of mechanical rubber goods on the Pacific Coast, is confident that 1929, despite a rather slow start as compared with the beginning of 1928, will produce an excellent volume of business. He bases his view on the fact that agricultural and business conditions are very sound. He also looks for an early easing up in money rates for commercial needs, which should benefit dealers in rubber and other goods.

Plant Rubber & Asbestos Works, San Francisco, Calif., has been merged with The Paraffine Companies, Inc., the latter acquiring the former through an exchange of shares for the total stock of the Plant company, according to President R. S. Shainwald of the Paraffine concern, makers of paints, shingles, wall and fiberboard, floor coverings, asbestos and other products. The Plant company was started in 1900. It took over in 1904 the West Coast Rubber Co., in 1909 the Panama Rubber Co., in 1910 the Barton Packing & Rubber Co., in 1912 Asbestos Manufacturing & Supply Co., in 1913 Magnesia Asbestos Supply Co., and in 1920 Merle Magnesia Co., the latter bringing with it a fine mill at Redwood City, Calif., which the Plant Division will continue to operate while manufacturing a large line of mechanical rubber goods and distributing all kinds of hose and belting.

As a result of the change, President and Manager Sidney L. Plant and Secretary-Treasurer Elliott H. Pierce retire, First Vice President Charles A. Wright becomes general manager, Second Vice President Milton S. Sprague is a special salesman, Sam. J. Gillis is waterfront man, and Bert L. Hons looks after insulation and hose and hose rack equipment.

Inland Rubber Co., Chicago, Ill., reports satisfactory coast business and especially in the new heavy duty tire line. Vice President C. P. Turner, who is also resident manager of southwest sales, with headquarters in Los Angeles, reports that in the next 60 days company stores will be opened in Pasadena, Santa Anna and San Diego. A large volume of tires is marketed through concessions by general merchandise stores in the Southwest.

Patterson-Ballagh Corp., 65th St. and Wilmington Blvd., Los Angeles, Calif., manufacturers of rubber goods for oil field work, is now operating to full capacity in its new $75,000 plant and handling over 5,000 pounds of rubber composition daily. J. E. Walker, chief engineer, who has several rubber machinery devices to his credit, designed and supervised the erection of the plant and the installation of the up-to-date equipment which effects a 40 per cent saving in the handling of products. A complete laboratory outfit was the latest addition to the equipment, and another 48-inch roll mixer is about to be added. Herbert N. Wayne, rubber expert, has been engaged in an advisory capacity for the production department. The principal specialty being made is the Bettis rubber protector for well-drilling stems. C. L. Patterson is president, and is now on a trip to Cuba. Robert Schurman is vice president and J. C. Ballagh secretary-treasurer.

Goodyear Tire & Rubber Co. recently entertained at the Los Angeles factory 150 members of the Young Australia League who were en route to Washington, D. C., to witness the inauguration of President-elect Hoover. At the same time five executives of the Goodyear factory in Australia, who were en route to a conference at the parent plant in Akron, also visited the Los Angeles plant. They were E. W. Machan, manager of personnel; S. H. Baker, factory accountant, and C. C. Flinn, E. L. Haverstick, and R. J. Paul of the labor-training division. Recent visitors from Akron have been R. P. Dinsmore, chief chemist; Robert T. Howes, development department, who had helped to establish the Goodyear concern at Wolverhampton, England; and E. D. Alboid, manager of the technical service.

Edison Talks on Rubber

Thomas A. Edison recently celebrated his eighty-second birthday at Fort Myers, Florida. When questioned on the subject of rubber, the veteran inventor gave the following answers:

Q.—Have you ever given any thought to the chemical development of synthetic rubber?

A.—No. It has no future when rubber is quoted at 23 cents per pound.

Q.—Will the manufacture ever be extended to the point where it will be used for the pavement and road service?

A.—Yes. Short sections have been in use in Scotland for five years with great success.

Q.—How will the success of your rubber experiments affect the future agricultural prosperity of Florida?

A.—I believe those states bordering upon the Gulf of Mexico can grow plant rubber with profit to the farmer in case of war prices, but it might be possible in the future to grow rubber and compete with the tropics.

Q.—Is it true that you have found a plant which promises to solve the rubber production problem in the United States, and do you hope to develop it this winter?

A.—I have found over 1,200 plants to produce rubber. About forty of them will be cultivated on a large scale.

United Rubber Corp., 37 Arkansas St., San Francisco, Calif., according to President Herbert King, is now specializing in hard rubber goods for the battery trade and has contracts covering most of its output for about a year ahead and expects to get into full production and on a 24-hour daily working schedule early in March. The new works start with a very up-to-date equipment for the making of battery boxes, etc., and a well-selected working force. The other officers, besides Mr. King, are: L. B. Sargeant, vice president; and C. C. Barre, secretary, all San Franciscans.

Feather-like Pneumatic Products Co., 5911 S. Broadway, Los Angeles, Calif., operates one of the unique rubber shops on the Coast. Among its products are airplane cushions for the U. S. Army and Navy, advertising balloons, inflatable mattresses and life preservers, camping outfits, made-to-order wading breeches for hunters and fishermen made from dirigible balloon rubberized fabric, and specialties for motion picture work. According to Arthur A. Leltic, manager, business is exceptionally good.

Franz Foundry & Machine Co., Akron, Ohio, which recently established a branch factory at 720 E. 60th St., Los Angeles, Calif., has quite completed the installation of its mechanical equipment. The products will include tire molds, cores, rings, etc., and special facilities have been provided for engraving tire molds. It is stated that local tire factories are fairly crowding the new concern with orders. H. R. Brown is superintendent; J. J. Unckrich, sales manager; and Wm. Franz, office manager. President C. W. Franz, of Akron, was a recent visitor.

Western Sulphur Industries, Inc., is installing equipment at its works in Harbor City, near Los Angeles, for the manufacture of rubber manufacturers' sulphur in addition to sulphur for other industrial needs. Various samples of sulphur are now being tested in the laboratories of the several large tire factories in the Southwest in order to determine specifications on which the rubber trade requirements may be supplied. The company's city address is Roosevelt Building, Los Angeles, Calif.

Willys-Overland Co. was on Feb. 7 host to a large assembly of representatives of the rubber and other industries of the Southwest on the occasion of the opening of its new $1,500,000 assembling plant at Maywood, near Los Angeles, Calif. John N. Willys, of Toledo, Ohio, president of the company, greeted the guests and spoke on the domestic and foreign trade advantages of the lower Pacific Coast region. The factory is the

"last word" in efficient lay-out and has an annual capacity for 30,000 cars.

Samson Tire & Rubber Corp., Los Angeles, Calif., is hurrying the building of the foundation of its big plant and it is said that unless something quite unforeseen should occur it will be completed even earlier than within the time scheduled. The present plants at Compton and San Diego are working at utmost capacity on three shifts a day trying to catch up on an exceedingly large spring-dating business and to get ready for the later seasonal rush. January's unfilled orders greatly eclipsed all previous records. Heavy truck pneumatics are in exceptionally strong demand owing to the rapidly growing tendency of many bus and truck owners to discard solids in favor of "pneus." Demonstrated economic advantage of the latter and increasing opposition to solids by city and state authorities are cited as strong factors in spurring on the change-over.

Pacific Goodrich Rubber Co. has nearly completed the installation at its Los Angeles plant of an additional battery of vulcanizers, tire building machines, and tube-forming apparatus in order to increase the output 50 per cent. That this goal will soon be passed is the opinion of F. E. Titus, general sales manager; Jay Smith, manager of pneumatic tire sales; and J. L. Kelly, branch administration manager, who have just completed a long tour among the branches in the eleven western states served by the company, and also completed an aggressive sales programme for 1929. The Pacific concern will now have an advertisement department separate from that of the parent company at Akron. It will be in charge of E. T. Morris, who has had much experience in Philadelphia and Akron. A. L. Fullwood will continue as district advertising manager. F. J. Maccammon has been appointed branch manager at Oakland, Calif., and R. J. Loomis has been transferred from the latter place to the management of the Denver branch.

India Tire & Rubber Co., Akron, Ohio, according to Pacific Coast Manager W. R. Wheatley, has negotiated with Milton H. Crowe of the Tansey-Crowe Co. for exclusive distribution of Indias in the San Francisco region. Mr. Crowe had been distributing Pennsylvania vacuum-cup tires in that section for eighteen years.

The General Tire & Rubber Co., Akron, Ohio, is not planning for a branch factory on the Pacific Coast according to President William O'Neil, who recently addressed sales conventions of branch managers and distributers in Seattle, San Francisco, and Los Angeles. Mr. O'Neil said that the company was much pleased with the gain scored in gross sales in 1928 over 1927 of over 12 per cent, and he believes that the figure of $26,154,000 reached last year will be largely increased in 1929 and to a considerable extent through replacements occasioned by the greater use of high-compression motors and 4-wheel brakes. He sees nothing in the business situation to lessen a continuance of good times. As for a coast factory, his company had in mind a $10,000,000 sales goal in the western territory before undertaking a tire-making plant.

Firestone Tire & Rubber Co., of California is turning out some 3,600 tires a day at its Los Angeles factory, according to Gentral Manager R. J. Cope; but this average will be steadily raised to 7,500 early in the summer. Meanwhile a considerable amount of new machinery is being installed to increase the output, and to make it no longer necessary to depend upon the parent plant in Akron to help in filling orders. Additions are being made daily to the working force, which in mid-February numbered 1,050. The company is developing a good export trade with Japan and the Hawaiian and Philippine Islands. Mr. Cope brands as untrue a rumor that the Firestone company intends opening a chain of stores throughout the country to market its products. Recent visitors at the plant were Treasurer J. J. Shea and Purchasing Director W. T. Lewis of the parent Firestone company in Akron. The Xylos Rubber Co. 5-story building on the Firestone property is now reclaiming rubber on a quantity scale under the management of W. H. Funston, assisted by H. H. Hummer.

Fisk Rubber Co. of New York held a convention of salesmen and managers at the Hotel Alexandria, Los Angeles, Feb. 13 and 14, the delegation representing Southern California, Colorado, Nevada, and Arizona, and being headed by G. Al Wood, Los Angeles district manager.

F. H. Banbury, well-known inventor and manager of the internal mixer department of Farrel-Birmingham Co., Inc., Derby, Conn., has been making a business trip to the Pacific Coast.

Neversoil Rubber Products Co., formerly California Rubber Products Co., of 621 East Ninth Street, Los Angeles, Calif., manufacture hospital supplies, tubing, aprons, shower curtains, gloves, sheeting and mats.

Southwestern Rubber Co., 516 E. 4th St., Los Angeles, Calif., reports a marked increase in business thus far in 1929. The concern makes first quality camelback and other tire repair materials, and is owned by F. J. Keese and H. P. Gates.

A. L. Friedlander, vice president in charge of production, and H. S. Mooradian, factory superintendent, Dayton Rubber Manufacturing Co., have been making a study of truck tire needs in the oil fields of the Southwest.

Ward B. Algoe, formerly connected with the Chanslor & Lyons Co., Seattle, Wash., has been appointed northwestern district sales representative for the Thermoid Rubber Co., Trenton, N. J., with offices in Seattle.

Los Angeles Group Rubber Division, A. C. S.

At a well-attended dinner and meeting of Los Angeles Group, Rubber Division, A. C. S., at the Mary Louise restaurant Jan. 31, R. P. Dinsmore, chief chemist of the Goodyear Tire & Rubber Co., Akron, Ohio, gave a very interesting illustrated talk on "Some Practical Aspects of Rubber Evaluation." He supplemented his remarks on means of judging crude and manufactured rubber with answers to many questions. President Pond expressed appreciation of Mr. Dinsmore's discourse and noted with much satisfaction the large increase in attendance. Many new members were added to the roster.

Midwest

The Baldwin Rubber Co., Pontiac, Mich., has announced that Nelson B. Eldred, Jr., formerly of Portland, Maine, will succeed the late William N. Keller as purchasing agent and office manager.

The Alfred Hale Rubber Co., Atlantic, Mass., will be represented in Chicago and the Northwest by the H. L. Patzer Co., 1714 Fond du Lac Ave., Milwaukee, Wis.

The Huetter-Premier Machine Co., 7215 Livernois Ave., Detroit, Mich., reports business satisfactory with orders coming in from foreign as well as domestic manufacturers.

Servicised Products Corporation makers of Servicised Products for compounders, has moved to 53 West Jackson Blvd., Chicago, Ill.

Tire Price Reductions by Mail Order Houses

To meet the price reductions announced by the leading rubber companies in November, mail order houses have reduced tire prices from seven to twenty per cent. It is also reported that they have adopted a tire guarantee which is in many respects similar to the warranty sponsored by the Rubber Institute.

Goodrich Fellowship Created

The B. F. Goodrich Co. has established a chemistry fellowship at the University of Akron, according to an announcement made by Prof. H. E. Simmons, head of the chemistry department of the University. This scholarship is in addition to those maintained by Goodyear and Firestone.

The Goodyear fellowship for the present year went to Sheldon C. Nichol, a graduate of the University of Illinois, and John T. Whittenberg of the same university holds the Firestone.

H. O. SMITH HAS RESIGNED AS CHIEF of the automotive division, Department of Commerce. He will spend a short vacation in the South before announcing his future plans.

Canada

Footwear Stocks Large

There is no definite news about the new spring prices of rubbers, but it is fully expected that the new list will show a reduction of about 10 per cent; this list will be issued about March 1. The market in crude rubber has been stronger than for some months past so the prophets are probably right in predicting that the new list will show a cut of not more than 10 per cent.

We understand that overshoe stocks are considerably larger than they should be, and there will be a heavy carryover. The explanation may be twofold. It may be that people throughout the country districts wear heavier leather footwear for the most part than city people. Besides, country retailers as well as city retailers, are probably cautious about sending in repeat orders now in order to avoid having too much of a carryover at the end of the season. However, there are still a few weeks left in which the weather man may have a chance to redeem his reputation with the wholesale trade.

Goodyear Tire & Rubber Co. of Can. Ltd. Production of the new Toronto plant will shortly be increased from 9,500 tires to 10,500 daily. The new addition has been completed and machinery is being installed while changes are being made in the main plant to permit of increased and more economical operations.

Canadian Connecticut Cotton Co., Ltd., now owned by the Dominion Textile Co., Ltd., Montreal, and operating under the name of the Sherbrooke Cotton Co., Ltd., is wide awake to the possibilities of this tire fabric factory at Sherbrooke, Que., and figure that at the present time that only fifteen per cent of the tire fabric market is available to the company. Steps will be taken, it is said, to secure some of the business which is now going to foreign companies or to Canadian subsidiaries of American concerns.

Seiberling Rubber Co. of Canada, Ltd. Recent large orders placed by this company for additional equipment and new machinery are the forerunners of an expansion program. C. A. Jones, vice-president and general manager, is quoted as saying: "The necessity of increasing our manufacturing facilities is brought about by the sales increase that Seiberling tires have enjoyed since our establishment in Canada in May, 1927. In a period of less than two years Seiberling sales have advanced from nothing to well over two million per annum. Production schedules for almost every month of 1928 exceeded the schedules of the preceding month, and January of this year reached the record peak production of the organization's history," concluded Mr. Jones.

The Jos. Stokes Rubber Co., Ltd., Welland, Ont., manufacturers of hard rubber specialties is putting up a factory addition at a cost of approximately $20,000, exclusive of machinery.

Major E. E. Williams, Ottawa branch manager of the Dunlop Tire & Rubber Goods Co., Ltd., Toronto, was the unanimous choice as president of the One Hundred Club, one of the lively service clubs of the capital city.

Prof. G. S. Whitby, of the chemistry department of McGill University, Montreal, has been awarded the first Colwyn Gold Medal, an award instituted by Lord Colwyn last year for conspicuous services of a scientific or technical nature dealing with the improvement of rubber manufacture or production. The award was made following deliberation and consideration by the council of the Institution of the Rubber Industry.

T. Y. O'Neill, Miner Rubber Co., Ltd., Granby, Que., has returned from a trip to Western Canada where he found good reason for optimism regarding 1929 and is looking forward to a prosperous season.

The Capital Tire Sales, Ltd., Ottawa, Ont., has been granted a charter to do business in Canada.

Airless Tire Corp., Montreal, has been granted letters patent to manufacture rubber goods and buy and sell rubber.

Gregory Tire & Rubber 1926, Ltd., British Columbia, is making extensive changes at its plant at Port Coquitlam, and improvements in its office at 631 Howe St., Vancouver, in order to meet increasing demand for its products in the domestic and export trade, according to Managing Director Fraser Jamieson, who has succeeded R. E. Jamieson, deceased. He states that conditions in the Canadian Northwest are very promising for 1929, and that the company has orders enough on hand to operate its enlarged plant on a 24-hour-day basis.

Rubber Association of Canada

The ninth annual meeting and banquet of the Rubber Association of Canada was held at the King Edward Hotel, Toronto, on Jan. 29, 1929. The banquet was attended by about three hundred association members and their guests and was presided over by E. W. BeSaw, the retiring president. Addresses were made by Justice Riddell, J. A., LL.D., F. A. Seiberling, president of the Rubber Association of America, and Rev. Canon H. J. Cody.

At the annual meeting the following were elected directors: C. H. Carlisle, C. A. Jones, W. A. Eden, J. D. Hathaway, J. H. Coffey, Jr., W. H. Miner, F. L. Freudeman, John Westren (ex officio), and E. W. BeSaw (ex officio). The officers elected are as follows: C. H. Carlisle, president; W. A. Eden, vice president; C. N. Candee, treasurer; C. A. Jones, assistant treasurer; A. B. Hannay, manager and secretary.

A. B. Hannay, manager, emphasized the fact that while this was a poor season for the domestic trade of Canada, due to unusually open weather, on the other hand the export trade was the largest that the industry has ever enjoyed, amounting to 9,500,000 pairs at a value of $8,500,000.

Solid Tires Disappearing in New Zealand

The use of the solid rubber tire in New Zealand is fast decreasing. Distributers, who once carried heavy quantities of stock, are now proceeding cautiously and watching their stocks to avoid overstocking. In 1925 and 1926 imports of solid rubber tires exceeded 6,000; it appears doubtful if they will attain 5,000 in 1928.

Principal reasons for decreased sales are due to the fact that prices for solid tires are higher than those asked for pneumatic tires. Consumers complain that they receive less mileage per gallon on the solid product. Extra taxation has been imposed on vehicles equipped with solid rubber tires, and in many cases drastic regulations have been adopted by individual municipalities prohibiting vehicles which are equipped with solid tires on the roads during certain months.

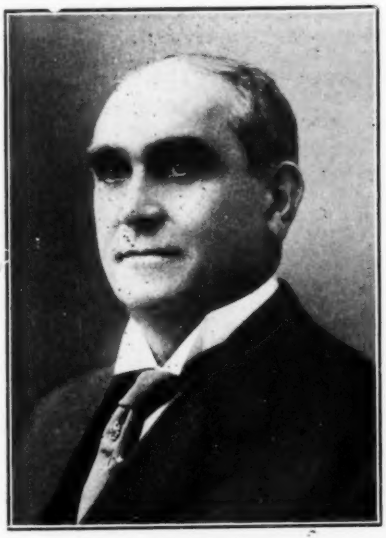
MILLROOM OF THE MANHATTAN RUBBER MFG. CO., PASSAIC, N. J.

Obituary

Old-School Rubber Man

Ira Foss Burnham, president of the Stoughton Rubber Co., a fine type of old-school rubber manufacturer, died January 30 at his home on Park street, Stoughton, Mass., his unexpected passing after a four days' illness grieving a wide circle of business and social friends to whom he had endeared himself by his unfailing courtesy, quick sympathy, ready appreciation, and unvarying fairness in all his dealings.

Mr. Burnham, whose experience in the rubber industry up to the time of his retirement in 1924 covered some forty-six years, is remembered by the older men in the trade as the first to discard foot power sewing machines for steam driven ones



Ira F. Burnham

in making rubberized clothing and the first to replace the old solarizing process for curing proofed fabrics with dry heater vulcanizing, supplementing these with many other progressive changes in factory practice.

He was born in Hollis, Me., February 9, 1853, being the son of Simon and Mary Burnham, the thirteenth in a family of fifteen children. The family moving in 1855 to Biddeford, Me., he got his primary education there, and graduated from the high school in Portsmouth, N. H., in 1871. He worked first as a dry goods clerk, continuing in that line when the family moved in 1872 to Boston. Rubber attracted him in 1878, when he became a salesman for the Mystic Rubber Co., of Boston, and he also carried some lines for the Hall Rubber Co. In 1882 he moved to Stoughton and was made superintendent of the Mystic factory there.

When the Mystic concern was in 1889 reorganized as the Stoughton Rubber Co. he continued as superintendent, and in 1903 was made president and general manager. In 1908 he was also elected treasurer and in 1915 director. He remained as president and director until his death. Since 1916 he had also been vice president and director of the American Rubber Co.

After serving for many years as vice president and chairman of the investing committee of the Stoughton Trust Co., he was chosen president in July, 1926, and held that office until his death. He had also been a selectman on the city board in 1901-02 and had been chairman of the board in 1922-23-24. He was a Republican and his counsel was much sought by state leaders. His civic activities also included the old Board of Trade, Chamber of Commerce, and the Veteran Firemen's Association. He was a member of the Boston Chamber of Commerce, Rubber Association of America, Inc., Post 72, G. A. R. Associates, and was Commander of the old Stoughton Grenadiers in 1892-93-94-95.

Mr. Burnham was master of Rising Star Lodge, A. F. & A. M., of Stoughton, in 1884-5; high priest of Mount Zion Royal Arch Chapter of Masonry, 1894-5; district deputy grand master, 22nd Masonic district, 1895-6; member of Brockton Council, Royal and Select Masters; eminent commander of Bay State Commandery, K. T., Brockton, 1899-1900. He was a charter member, director and president (1912) of the Chicataubut Club, before which he gave an address on the rubber industry; and was also a member of the Wampatuck Club of Canton.

He married Miss Fannie J. Wiggin of Portsmouth, N. H., in 1874. She died in 1906. Of his five children one, Forrest Emerson Burnham, is superintendent of the American Rubber Co. In 1908 he married Mrs. Gertrude DeLaite-Paul of Melrose, Mass.

The funeral was held February 2 at the Universalist Church in Stoughton, and the burial was in Evergreen Cemetery. More than 600 attended the services.

R. H. Pease

R. H. Pease, former president of the Goodyear Rubber Co., and until a few weeks ago a resident of San Francisco, Calif., died in El Paso, Texas, January 25, from burns received when an automobile in which he was sitting caught fire.

Rufus F. Herrick

Rufus F. Herrick, 63, consulting engineer, died suddenly at the Haymarket Relief Station at Boston, Mass., after being stricken ill while on board a Boston bound Boston & Maine train. His offices were at 24 Milk St., Boston, and his home at Herrick St., Winchester. As an engineer he invented the rubber paving block that has been used to pave the streets and approaches to various local hospitals.

Former Superintendent of the India Rubber Co.

Grant Lambright, a well known rubber man, died last month in Red Wing, Minn., where he was employed as superintendent of the Durkee-Atwood Rubber Co.

Mr. Lambright was well known in the Akron rubber industry, having been associated with the industry all of his life. He was born in Canal Fulton and came to Akron when a boy of 16 years. He started his career in the rubber business at The B. F. Goodrich Co.

Following his affiliation with the India Rubber Co., as superintendent, he made Akron his headquarters, although he was

Grant Lambright

associated with various rubber companies in Marion, Bucyrus and Seattle, Wash.

Besides his widow, he leaves three brothers, John, Samuel, Stephen, and three sisters, Mrs. Alice Newcomer, Mrs. Belle Buckmaster and Mrs. Nan Roads, all of Akron. Burial was in Akron.

Franklin H. Kalbfleisch

Franklin H. Kalbfleisch, who died at his home in Babylon, L. I., on Jan. 30th, 1929, was head of the Kalbfleisch Corp., until 1920 when, due to ill health, he retired from active participation in business. He was born in Brooklyn, N. Y., on March 3rd, 1846, and spent his lifetime in the chemical business.

Mr. Kalbfleisch was a man of resolute personality but of kindly and generous disposition and enjoyed the respect of all who knew him. He leaves two daughters, Mrs. Maud Kalbfleisch and Miss Augusta S. Kalbfleisch.

Angus Nelson Smith

Angus Nelson Smith, purchasing agent of the United States Rubber Co. plants in Providence, died Jan. 31 in his 61st year at his home in Edgewood. He had been ill about a year.

In addition to his activities in the rubber industry, which began at the old Revere plant in Boston, he had been a prominent church worker and was well known in Masonic circles. Born in Barrington, N. S., he followed the seas as a companion for his father on vessels plying the North Atlantic routes.

Balloon-Tire Sizes Revised

Two Sizes Eliminated from Standard List and One Size Added to Division

At a meeting of the Tire and Rim Division of the S. A. E. held in Detroit on Jan. 17, the question of further balloon tire standarization and simplification was considered. The question of marking tires for balance was discussed at a meeting of the Tire Steering Committee, held in December, and a questionnaire was outlined which was later sent to the motor-car companies to determine the most acceptable method for so marking tires.

Results of Questionnaire

The results of this questionnaire indicated that, of 36 companies, 34 were willing to accept a marking consisting of a red dot or a ¼-in. square on the serial number side of the casing, just above the rim flange, to indicate the valve location. As this method is in rather general use and is so overwhelmingly favored, it was deemed advisable to approve this method of marking as part of the present S. A. E. standard on balloon tires and rims. Therefore the Tire and Rim Division will submit to the Standards Committee for approval the recommendation that the following note be added to the present specifications:

Note.—Tires shall be marked for balance by means of a red dot or a ¼-in. square on the serial side of the casing just above the rim flange.

One of the primary purposes of the meeting was to discuss possible elimination of the 4.75 and 5.25 cross-sections of tires from the present standard. In discussing the elimination of the 4.75-20, it developed that this size is considered the logical oversize for the 4.50-20 and therefore that, until further developments occur, this size should be retained.

Sizes 4.75-19 and 5.25-18 Deleted

Consideration was then given to the elimination of the 4.75-19 size and it was decided that, as there is virtually no use for this size as original equipment and it is not in use as an oversize, it can be discontinued without causing dissatisfaction.

Therefore, the elimination of the 4.75-19 size was approved by the Division.

The question of deleting the 5.25-18 tire from the table also was discussed and, while tires of this size are original equipment on one of the well-known cars, it was felt that, in view of the possibility of a change in tire equipment by this manufacturer, the 5.25-18 size could also be elminated, and it was so voted.

The 5.25-19 size was retained, after some discussion, as an oversize for the 5.00-19, although it is not in general use as original equipment.

A 7.00-19 Size Added

To provide a suitable oversize for the 6.50-19, and because of the probability of the adoption of this size by one or more manufacturers of large cars, it was decided to include in the table a 7.00-19 tire.

The complete revised specification, including the note on marking tires for balance, mentioned above, as it will be presented to the Standards Committee at the Summer Meeting in June, is given in the accompanying table.

BALLOON TIRES AND RIMS

	Tire Sections							
Rim Diameter	4.50	4.75	5.00	5.25	5.50	6.00	6.50	7.00
18	....	....	....	....	5.50-18 (28x5.50)	6.00-18 (30x6.00)	6.50-18 (30x6.50) (30x6.20)	7.00-18 (32x7.00) (30x6.75)
19	....	....	5.00-19 (29x5.00) (28x4.95)	5.25-19 (29x5.25)	5.50-19 (29x5.50)	6.00-19 (31x6.00)	6.50-19 (31x6.50) (31x6.20)	7.00-19 ....
20	....	4.75-20 (29x4.75)	5.00-20 (30x5.00) (29x4.95)	....	5.50-20 (30x5.50)	6.00-20 (32x6.00) (30x5.77)	6.50-20 (32x6.50) (32x6.20)	7.00-20 (34x7.00) (32x6.75)
21	4.50-21	....	....	....				
Rim-section width*, In.	2.75 Flat Base or Drop	4	4	4	4	4½	4½	5
Maximum tire width on rim, In.	4.75	4.85	5.15	5.35	5.60	5.95	6.40	6.90

*Rim widths given are nominal except the 2.75-in. size, which dimension is the actual width between flanges.

Method of Marking—Tires shall be marked with the tire cross-section followed by the rim diameter on which the tire shall be used; under which designation shall be placed, in small figures, the former name-size or sizes of the tires replaced.

Marking for Balance—Tires shall be marked for balance by means of a red dot or a ¼-in. square on the serial side of the casing just above the rim flange.

Rubber Mooring Swivel Insulator

A device serving as a rubber cushioned mooring for motor boats, yachts, etc., was described recently in the India Rubber World, Dec. 1, 1928.

A picture is here shown representing very clearly the device and its application between the top of the shank of the anchor or mooring and the end of the mooring chain. The links at either end of the cushioning device are swiveled to prevent fouling in service. The rubber buffer is in two blocks which compress under the steady or intermittent pull of the boat at the mooring, thus relieving the strain. Other features and advantages of the device are: the swivel is protected from becoming jammed by the mooring chain; it provides weight to the shank of the mooring holding it on the bottom; there is nothing to wear out or replace; it is easy to install and requires no attention in service.—International Motor Co., 25 Broadway, New York, N. Y.

Rubber Cushioned Mooring for Motor Boats

The Outstanding United States market during December 1928 for rubber belting according to volume was the Union of South Africa with 37,824 pounds valued at $18,746 and according to value the United Kingdom with 37,420 pounds, valued at $25,344. Australia was also an important market, taking 34,096 pounds, valued at $19,763.

The Rubber Industry in Europe

Great Britain

I. R. I. Annual Meeting

At the Seventh Annual General Meeting of the Institution of the Rubber Industry the result of the ballot for the election of the ordinary members of the Council was announced, the following having been elected: F. D. Ascoli, G. S. Bell, P. J. Burgess, H. H. Burton, R. T. Byrne, H. C. Cotes, G. H. Cock, P. Dunsheath, J. Entwhistle, H. G. Garnet, J. Gillan, A. E. Hemsworth, A. P. Ingram, F. G. Leahy, R. W. Lunn, C. Macbeth, W. de B. Maclaren, S. C. Mote, Dr. S. S. Pickles, D. A. S. Porteus, J. T. T. Randles, J. A. Redfern, H. Rogers, Dr. P. Schidrowitz, Sir Walrond Sinclair, W. C. Smith, Major J. H. Thompson, H. H. Tilley, J. Traxler, and H. C. Young.

On the motion of the Chairman, seconded by Sir Stanley Bois, Lord Colwyn was unanimously reelected president for the ensuing year. The following were elected vice presidents: Sir George Beharrel (president, Society of Motor Manufacturers and Traders); George Beldham, Esq.; Sir Stanley Bois (past president), Col. Sealy Clarke (chairman, Research Association of British Rubber Manufacturers); Wm. Duncan (chairman, Rubber Growers' Association); Sir Eric Geddes; F. W. Hinde (chairman, India Rubber Manufacturers' Association); Alexander Johnston (past president), F. O. Laughland (Chairman, Rubber Trade Association); Ernest Leete (chairman, Cable Makers' Association); Sir Charles Mandleberg; H. G. Montgomery; Charles Paine; Sir F. Swettenham; D. F. L. Zorn (chairman, Rubber Shareholders' Section).

H. W. Franklin was reelected treasurer.

The President presented the Institution's diplomas to the following:

Fellowship. Dr. W. J. S. Naunton, H. K. Turner.

Associateship, (Science). L. R. Nicholson, I. H. Robinson.

Associateship (Engineering). F. H. Amende, F. C. Jennings.

Long Service. W. Bisiker, W. Bryan, H. Coombes, A. Cripps, F. Ely, C. Fallows, F. W. Farmer, E. Fell, W. E. Fox, A. Harris, R. B. Harrison, J. Higgs, F. Hopley, H. Hughes, W. F. Lewin, W. W. Morrison, C. E. Pearce, A. H. Pearl, J. W. Roberts, G. A. Smith, S. Webber, A. E. Weeks.

Diplomas have also been awarded to the following:

F. W. Bennett, J. M. Bierer, Prof. G. Bruni, J. K. Burnridge, R. P. Dinsmore, F. Fellowes, Dr. H. K. Feuchter, Dr. W. C. Geer, S. C. Mote, S. Morgan, G. A. Proctor, D. G. Snodgrass, Dr. D. Spence, Prof. G. Stafford Whitby.

Associateship (Science). E. V. Bratby, F. S. Malm, M. L. Sahin, J. Stopforth.

Associateship (Engineering). J. Morrison, L. T. Wakeford.

Associateship (General Rubber Technology). W. J. Leonard, J. Stopforth.

Long Service. T. Anderson, A. Birrel, W. Cooper, W. K. George, F. J. S. Gray, W. Haworth, J. Hoggan, E. Hollingsworth, A. Lawton, R. M'Connell, J. Negus, G. J. Owens, W. C. Shrimplin, D. O. Sloan, W. Smith, H. Stevens, H. Stone, R. Waller, W. Wild, W. G. Woodbridge.

Rubber Imports and Reexports

On examining the figures of Great Britain's overseas trade in rubber during 1928, which have just come to hand, one is immediately struck by those relating to the imports and reexports of crude rubber during the year. These were respectively 109,412 tons and 105,012 tons, according to which only 4,400 tons were retained for local consumption. As the *India Rubber Journal* points out, this is little more than a month's home consumption, and consequently stocks already in existence have had to be drawn upon to the extent of 13,680 tons, as may be ascertained from the London and Liverpool port figures. Therefore the total amount of crude rubber that was apparently used by the British rubber industry was 48,080 tons. In 1927 rubber imports exceeded reexports by 59,842 tons, but the stocks in London and Liverpool at the same time increased by 14,941 tons, so that it seems that in the previous year, Great Britain's consumption of rubber had been 44,901 tons, or about 7 per cent less than for the year 1928.

The effect of the tire duty on the imports is amply demonstrated by the comparative figures for 1927 and 1928. In the former year the value of pneumatic tire covers entering the country had been £2,812,615 and in the year under review this had dropped to £737,189. Imports of tubes fell from £323,521 to £143,917, and those of solid tires were £91,241 instead of £169,436. The value of tire exports was £2,698,627 in 1928 against £2,822,615, of inner tubes, £501,975 instead of £580,-898, and of solid tires £226,178 against £348,674. At best then, and allowing for the fact that tire prices were lower in 1928, the tire export business showed no improvement over that of the preceding year. Attention is called to the drop in exports to Australia, from £174,196 in 1927 to £20,131, which of course is to be ascribed to increased local production of tires.

A heavy increase in imports of rubber footwear could not be offset by the meagre rise in the exports, the figures were, imports: 770,025 dozen pairs, valued £1,626,123, aganist 428,650 dozen pairs. valued £901,048, and exports: 270,814 dozen pairs, valued £456,255 as compared with 248,384 dozen pairs valued £407,132. Trade in waterproof apparel increased all around, imports rising from £74,709 to £114,004 and exports from £1,167,403 to £1,238,166. On the other hand imports of insulated wires and cables increased from £848,973 to £873,652, while exports fell from £4,532,927 to £4,353,733. Taken all in all, British business in rubber goods improved in 1928 as compared with 1927, but the improvement was not very great.

Optimistic Views

The *Daily Telegraph* publishes a review of the rubber situation by Eric Miller, who, in common with other experts, regards the future of the industry with optimism if for no other reason than that the automobile is rapidly gaining in favor all over the world and, therefore, an increased demand for tires may be expected for many years to come, and with it naturally the demand for rubber, not taking into consideration new uses for rubber that may be developed. Mr. Miller sees the American motoring public turning from the cheap tire that was popular and demanding one of better quality, which again is in favor of the consumption of crude rubber. Regarding stocks, he calculates that between January 1, 1928 and October 31, 1928, the decrease in total stocks was probably 40,000 tons greater than the increase of stocks on estates and in the hands of dealers within the restriction area. That is, during 1928, total world stocks of rubber decreased by about 40,000 tons.

As for production, no great increase of estate rubber is looked for in the next few years as compared with 1929, owing of course to the known fact that there was little new planting in the early restriction years. The matter of native rubber of course is one full of uncertainty, although Mr. Miller is of opinion that if prices remain at their present level no increases need be expected from this source and shipments will remain stationary until prices become sufficiently attractive to labor. The tendency to regulate price and output in connection with native rubber can be overdone. For it is a fact, as experts in the Dutch colonies have also pointed out, that if laborers are unwilling to work on rubber holdings for a low wage, they refuse to work regularly when wages are high because they want to have time to enjoy their new wealth. "When the accumulations in the East," Mr. Miller further says, "are distributed throughout the world, as is rapidly occurring, it will be realized more clearly than at present that there are really no excessive stocks in existence, and that the present stocks are no more than are necessary for the normal working of the industry. This

means that for the next few years production will have to cover not only absorption, but also the increase in the necessary working stocks which the increase in absorption will entail. Taking a broad view of the industry, it does not seem possible that production can be sufficient to meet these demands except at a substantially higher price than that now prevailing."

Poland's Rubber Industry

The Industrie-Werke Pepege, Polnische Gummi-Industrie A. G. Grudziadz, reports that the year 1927-28 was favorable both for Poland in general and their own firm in particular. Political and economical stabilization, the unchanged rate of the zloty and the ample crops harvested the year before, resulted in increased purchasing power of the population so that consumption was two to three times as high as in the preceding business year. Although the concern, which specializes in rubber footwear, trebled its output during the year it was not able to fill all orders.

According to the report, the firm's policy of supplying goods of quality at low prices, which incidentally forced competitors to cut prices too, is in a large measure responsible for its success. The low price of the rubber footwear brings it within the reach of almost everyone. It is also interesting to learn that whereas up to a comparatively short while ago summer shoes with rubber soles and heels were almost entirely unknown in Poland, the Pepege was able to sell about 3,000,000 pairs of this type of shoe in the past year.

The Pepege produced in October, 1928, about 20,000 pairs of galoshes and rubbers, and about 10,000 pairs of summer shoes per day, so that it ranks probably as the biggest producer of rubber footwear in Western Europe today. Besides footwear, the firm also produces 1,000 bicycle tires and tubes and 200 to 300 rubber coats per day. By the addition of new buildings the area of the factories has practically been doubled during the year under review.

While the firm employed about 2,500 persons in October, 1927, the number had increased to almost twice that in 1928. The most modern equipment is used in the various factories of the concern, which recently acquired a factory in Wabrzezno, not far from Grudziadz, where about 300 persons are employed in making raincoats and rubberized fabrics. In May, 1928, a rubber footwear factory was acquired in Warszawa, which started operating in July of the same year and now produces about 2,000 pair of galoshes per day.

Total sales during the year came to some 28,400,000 zloty, of which 22,969,710 zloty represented local sales and 5,422,906 zloty represented exports. Net profits for the year came to 1,247,801.03 zloty. The capital, which is now 4,000,000 will be raised to 10,000,000 zloty if proposals for a new issue of 6,000,000 zloty worth of shares goes through. A zloty has a normal value of $0.1622; at present the rate of exchange is $0.1120.

Germany

Tire Selling Abuses

Complaints regarding the situation in some of the branches of the rubber industry are constantly being made public. Recently the tire industry has come into the limelight. It seems that so many abuses have crept in that the tire selling business has become one of the unsoundest branches in the rubber industry. This is due for the most part to a pernicious system of giving discounts whereby the average car owner can obtain tires at prices from 10 to 30 per cent below the regular retail price. Most of the sporting and other associations in order to attract members offer tires at greatly reduced costs to their members. So that in the end not only the tire dealer but the manufacturer too suffers. In consequence an agreement has been reached which will go into effect January 1, 1929. The following organizations will cooperate: The Association of German Tire Manufacturers, individual foreign tire manufacturers, German Automobile Dealers Bond and the Association of German Tire Dealers and Repairers.

The first step will be to restrict retail sales to the legitimate tire and automobile trade. Thus automobile manufacturers and their branches will only be supplied with tires at dealers' prices in so far as these are intended for original equipment of the automobiles, and the sale of separate tires will be prohibited to automobile manufacturers. But representatives of automobile manufacturers, working independently will be allowed to deal in tires. Furthermore, discounts to tire dealers will be decreased from 25 to 17½ per cent, although the scale of bonuses, going up to 10 per cent according to the sales of the dealer, will be maintained.

Another and rather important change planned is the marking of seconds, as such. Up to the present, these have not been so classified and as a result the dealer often was able to cut prices on the plea that the goods were seconds. But now each imperfect tire will be indelibly stamped and offered to the dealer with a special discount. From now on complaints by customers regarding regular goods will only be met by an offer on the part of the manufacturer to exchange the tire.

Rubber Propaganda

As a cure for the poor selling possibilities of rubber goods in various branches, of which constant complaint is heard, the *Gummi-Zeitung* suggests that a German rubber week should be inaugurated, following the example of the British rubber goods manufacturers who are planning such a campaign to take place in the week of February 25 to March 2. It is suggested that such a movement should be led by the National Association of the German Rubber Industry and the two rubber dealers associations. That such a week be reserved also in the Spring and that propaganda be made by means of specially dressed windows, articles in the daily papers, posters, etc. To meet the expenses of such propaganda it is proposed that part of the contributions that the associations in question receive could be reserved for the purpose.

Rubber Footwear

It is reported that the Ueberscuhe—Vertriebsgesellschaft m. b. H., recently established at Frankfurt a. M., will undertake the sale of the Goodrich overshoe for Germany. The manufacturer is the well-known American firm, The B. F. Goodrich Co. Incidentally, rubber footwear is rapidly gaining in popularity here and the various shoe shops feature a variety of styles. But a great drawback is the fact that foreign overshoes are in greatest demand. The reason is not inferiority of German makes or styles—the German is usually quick enough to imitate the good points of an article—but rather that the German rubber shoe manufacturer does not seem to be able to deliver the latest styles promptly enough, nor can he supply models, and finishes in the quantities desired. As a result the shoe dealer has no other recourse but to stock the foreign article.

The Rubber Industry of Austria

The Austrian Chamber of Commerce, Trades and Industry reports that the rubber industry was in a satisfactory condition during the year 1927-28. The consumption of crude rubber showed a marked increase, owing to good demand locally, which in turn was due to a general improvement in economic conditions in the country.

The local demand for solid and cushion tires was met for the most part (80-85 per cent) by local products, and in spite of the comparatively low tariff on these goods, imports were only a little higher than exports. The situation in pneumatic tires is not quite so good, although here too an increase is noted and locally produced tires now cover 60 per cent of the home demand, while exports have increased 100 per cent. Imported automobiles are always equipped with foreign tires, whereas Austrian made automobiles are exported without tires. On the whole, prices for rubber goods have not undergone any change.

With regard to asbestos goods and packing the situation is not so satisfactory, and no improvement over the previous year has been noted, on the contrary the trouble has been aggravated in the case of asbestos goods by the circumstance that owing to a shortage of the raw material, prices have gone up.

The Rubber Industry in the Far East

Malaya

The Start of Budgrafting

The history of budgrafting in the Dutch East Indies is well known, thanks to the publications of the Experiment Stations which are also responsible for keeping those interested posted on developments. In Malaya, however, very little has been published regarding this side of the planting industry and the average reader has been left to imagine that little or nothing is being done about budgrafting in this colony. The manual, *The Budding of Hevea in Modern Plantation Practice*, by F. Summers of the Rubber Research Institute, Malaya, is therefore all the more welcome. The work of course also reviews progress made in the Dutch colonies, but what is of chief interest at the moment is the data concerning what has been done with budding in Malaya.

Budding in Malaya started in 1921 when Gough, of Kajang Estate took the first steps in this direction. This example was soon followed by a number of other estates, so that at about this time a fairly considerable area was budgrafted. In the beginning of the following year, the laboratory of the Rubber Growers' Association began to take an interest in the work and tried to spread the practice of budding by holding a series of demonstrations both at the laboratory and on various estates, the first buddings of this kind being made on Kamunting Estate in October 1922.

Pinching undertook selection work in 1923, especially on Pilmoor, and planted an area of about 12 acres with buddings from 21 carefully selected mother trees. However, after a short interval, interest in budding waned and very little more was done about the matter until about 1927 when activities in this field revived so that during the 1927-28 season we find thousands of acres planted with buddings, but as a measure of precaution seedlings were planted along with them. Most of the budding material was obtained from Sumatra, although several promising clones resulting from Gough's pioneer work were also used.

These clones are known as the Sungei Reko, Prang Besar and Sungei Tawar clones, after the estates on which they were planted. In October 1921, The Sungei Reko clones were started when about 70 acres of seedlings were budded in the field. Toward the end of 1925 the young trees were tapped for the first time and the highest average yield of dry rubber per tree per tapping obtained was 23.9 gr., while the lowest was 14.1 gr. Experimental tapping was renewed in 1926 when it was found that clone S. R. 9 had improved considerably and was giving an average of 29.5 gr. of dry rubber per tree, per tapping.

The Prang Besar clones were planted on Prang Besar estate between December 1921 and April 1922, again by Gough. Here an area of about 380 acres was budded with 108 different clones, the material being obtained from selected mother trees from neighboring estates. In July 1926 experimental tappings were conducted with the aim of selecting the 24 best clones which were subsequently carefully observed as to growth and yields. Finally successive experimental tapping reduced the number of approved clones to nine. The best of these clones during February, 1928, until June 1928, inclusive, yielded an average of 32.3 gr. dry rubber per tree per tapping, when the trees were a little over 6 years old. The lowest yield recorded was 22 gr. of dry rubber for a clone of six-year-old trees.

The Sungei Tawar Estate is intended to be planted chiefly with selected budgrafts. Work here was commenced as a result of success obtained on the Gula Estate with idea of planting up the newly opened up Sungei Tawar Estate for the most part with budgrafts from Gula and Kalumpong Estates. By 1922 about 500 acres had thus been planted up and by degrees more land was planted with buddings, so that by 1924 about 1250 acres in all were under this material. Tapping on this estate was only recently started and the data obtainable is therefore scanty, but it seems likely that results will not be behind those of Prang Besar.

Forward Sales

Just at this time when rubber prices are looking up, it is interesting to take note of some of the recent forward sales entered into by Malayan companies. Alor Gajah Rubber Estate Ltd. reports that it sold forward 15 tons for delivery November-December 1928, at 28 cents (Straits currency) per pound. In addition it has contracted to deliver during 1929, 2½ tons monthly at 30 cents per pound, and 5 tons monthly during January-March 1929 at 30½ cents per pound.

Pajam Ltd. sold forward 150 tons for delivery November-December 1928, at an average of 29 cents per pound and 20 tons monthly for the whole of 1929 at 30 cents per pound net. Last year the all-in costs of this concern worked out at 27.21 cents per pound. For the current year it is hoped to produce 1,420,000 pounds of rubber at an f.o.b. cost of 15 cents per pound since there will be no restriction of output to consider. The all-in cost will of course work out at several cents per pound more.

The Linggi Plantations sold forward 2,298,240 pounds at an average price of 10.14 pence per pound. No interim dividend was declared in 1928, as it was decided that under present circumstances the wisest course would be to await the full accounts of the year, before paying anything. Dividends during the restriction years were as follows: 1923, 7½ per cent; 1924, 7½ per cent; 1925, 32½ per cent; 1926, 25 per cent; 1927, 10 per cent.

Malayan Stocks

It was officially stated that the result of the census of rubber at the end of December 1928 was as follows:

Estimated dry weight of rubber of all grades on estates of over 100 acres: Federated Malay States, 21,743 tons; Straits Settlements (not including Singapore and Penang), 4,582 tons; Johore, not available.

Stocks of prepared rubber ready for sale on the same estates: Federated Malay States, 19,200 tons; Straits' Settlements (not including Singapore and Penang), 3,120 tons; Johore, 6,614 tons.

Stocks held by dealers: Federated Malay States, 9,154 tons, Straits Settlements (not including Singapore and Penang), 1,527 tons; Johore. 1,679 tons.

Dealers' stocks in Singapore and Penang at the same date: Smoked sheet and crepe, 26,829 tons; other grades 6,076 tons, total, 32,905 tons.

Estate News

The Melville (Johore) Rubber Estates, Ltd., have sold out to the United Sua Betong Rubber Estates, Ltd. The latter firm offered 28,000 fully paid up £1 shares for the Melville estates as a going concern, on the understanding that these shares would not participate in any dividends declared for 1928. At an extraordinary general meeting the United Sua Betong proposal was laid before the shareholders of the Melville company and accepted. The United Sua Betong £1 shares are at present worth £3:3:9, so that the price works out at $460 (Straits currency) per acre, and it is expected that the value of the shares will appreciate as soon as an improvement in the rubber situation sets in. Incidentally the United Sua Betong shares touched £7:8:9 in 1925.

The Castlefield (Klang) Rubber Estates, Ltd., earned £77,689 in the year ended June 1926. The following year this was £36,693, and last year only £229, and even this tiny figure was only obtained after £5,000 had been taken from reserves to meet a loss resulting from the sale of rubber stock held over from 1926-27. This company in the past fifteen years has paid out in dividends an average of 29½ per cent. Its capital is £100,000 in 1,000,000 2 shilling shares. These were quoted as high as 17 shillings 10½ pence in 1925, but are now only about 4 shillings.

Netherlands East Indies

Cost of Planting With Budded Stock

According to the report, the increased cost of planting with budded stock over planting with seedlings is about 40 guilders per hectare, or about $6.40 per acre. Budwood is bought by the meter which carries 15 buds on the average. Depending upon the record of the clone, this can be bought for 1 guilder to 20 guilders per meter. At present the latter type of material is only used for experimental purposes as it is expected that in two years' time the highest grade clones will have greatly multiplied and consequently the price for the record clones will have gone down. It is not considered economical to pay more than 2 guilders per meter for budwood for field planting on a large scale. The cost works out as follows, taking into consideration that the guilder equals $0.40 and the rectare 2:47 acres.

COST OF PLANTING 250 BUDS PER HECTARE

	Guilders
$250 \times \frac{200 \text{ cents}}{15 \text{ buds}} =$	33.333

BUDDING COST (LABOR)

Guilders 0.60 per 50 buds..............	3.00
Transportation, wrappings, etc..........	2.50
Total............................	38.83

Naturally only very skilful labor can be employed for this kind of work as a clumsy budder will spoil 14 out of 15 buds on a meter of wood thus raising the cost from 2.00 guilders to 30.00 guilders per meter.

Selected Budded Stock

The recognition that artificial measures of keeping up rubber prices do not solve the rubber problem but that the solution must rather be sought in increased yields and lower production costs focusses attention anew on the work done in the Dutch colonies in connection with budgrafting. A brief review of the use of selected budded stock on rubber plantations in the Netherlands East Indies has just been issued by the Bureau of Foreign and Domestic Commerce, Washington, D. C., from which some of the more outstanding facts will be abstracted.

It is pretty generally known that the clone method is used by the Dutch planters. A clone is a group of budgrafts descended from one mother tree, and a clone is not approved until it has been found to produce under carefully controlled conditions, a yield comparable to that of the mother tree.

The early experiments of the Avros., the East Coast of Sumatra Rubber Planters Association, led them to conclude that one-third of the mother trees would produce high-yielding clones, one-third, medium producers and one-third, poor yielders. As a matter of fact years of experimentation have subsequently shown that only 4 to 10 per cent of the high-yielding mothers give clones that at the age of seven years will give yields equal to or exceeding those of the mother trees, and that actually 90 to 95 per cent of the clones from high-yielding trees will, at the tappable age yield no more than the average seedling. At present, planting stock for new plantations consists exclusively of buds from approved and tested clones not less than seven years from the mother tree.

Record Yields

To understand what a vast difference there is in the yields to be obtained by the new methods of planting as compared with the old, it must be borne in mind that with unselected seed the yields were from 7 to 15 gr. of dry rubber per tree per tapping. Trees grown from selected seed of high yielding mothers yield 10 to 25 gr. dry rubber per tree per tapping, whereas some of the finest approved clones, 7 to 10 years old, give the following recorded yields in gr. of dry rubber per tapping:

Age of Clone, Years	Name of Clone	Average Yield Over Period		Gr.
10	Bodjong Datar 2	January-July,	1928	46
10	Bodjong Datar 5	January-July,	1928	68
10	Bodjong Datar 10	January-July,	1928	53
7½	Tjirandji 1....	January-July,	1928	84
8	Djasinga	June-July,	1928	46 to 111

It needs very little calculation to show that a garden planted with stock from these clones, might easily produce in its eighth year something like 1,000 pounds of dry rubber per acre, or to express the figure in kilos and hectares, 2,500 kilos per hectare. What this means becomes clear when it is known that the average production on the East Coast of Sumatra and in Atjeh in 1926 came to 389 kilos per hectare (about 350 pounds per, acre) while in 1927 this had increased to 407 kilos per hectare (about 365 pounds per acre). In the latter year the yield from the American estates was 511 kilos per hectare (455 pounds per acre), which was the highest average obtained in the two years.

It is calculated that if Java eventually succeeds in producing 1,000 kilos per hectare, as seems quite probable, the f.o.b. production cost at Batavia will be reduced to something like $0.08 per pound.

Estate Notes

Dr. O. de Vries, director of the Rubber Experiment Station, has been nominated extraordinary Professor of Chemistry at the Medical University, Weltevreden, Java. Prof. de Vries took up his new function after the Christmas holidays, but for the time being he will continue his activities in behalf of the Experiment station.

The value of automobile tires imported into East Coast of Sumatra during the first half of 1928 rose to 469,908 guilders from 267,769 guilders in the corresponding period of the previous year.

The exports of rubber from Java and Sumatra in 1928 amounted to 224,000 tons of dry rubber. Of this amount the total quantity of estate rubber was 139,300 tons (Java 59,000 tons and Sumatra and other outer possessions, 80,300), while the available data show that native rubber exports during the year were 128,500 tons gross, or about 85,000 tons dry (after allowance for dirt and moisture has been deducted). This native rubber is output on which export duties have been paid and does not include small quantities that have been exported without paying duty in the dutiable area, or that from the exempted area of Riouw and Dependencies.

Sorting Sheet. A device has been elaborated by P. Bakker of Soember Tlogo Estate, Dampit, consisting of a sloping table on which is attached a slab consisting of 4 by 5 white tiles, each being about 15 cm. square. A sheet of ordinary glass is placed on the tile slab at an angle of about 22½°. The structure has side walls painted white for reflection of the light. The sorter sits in front of the stand and can quickly examine the sheets without having to hold them up to the light as is the usual practice.

Preventing Mildew. Dr. Tengwall reports that spraying with sulphur from airplanes to combat mildew on Java estates has been successful and costs did not appear to exceed those of spraying from the ground. Various experts concur in the opinion that spraying with a powder like sulphur is to be preferred to spraying with a liquid, as the results are much more satisfactory.

At a recent planters' meeting where Dr. Tengwall gave the above opinion, Dr. Maas stated that at Tjipetir four new varieties of Hevea have been examined with the view of discovering one which would be resistant to mildew. Of these, one was discovered which seemed to show some differences. However there are 17 more varieties that have to be investigated.

Ceylon

Ceylon exported 57,832 tons of rubber in 1928 with a value of 74,000,000 rupees. This compared with previous years shows a marked decline in values, the difference as against 1927 being 45,000,000 rupees and against 1926, 96,000,000 rupees.

Tire Imports into French West Africa

Automobile tires of French manufacture have the largest sale on the French West African market. Of the total 284,599 kilos of tires imported during 1927, 251,821 kilos came from France, 14,074 kilos from Great Britain, 3,781 kilos from the United States, 653 kilos from Germany, and 14,270 kilos are listed as coming from other countries.

THE COMPAGNIE DU CAOUTCHOUC MANufacture of Saigon, French Indo China, which manufactures various rubber sundries, has equipment for making solid tires. These are made only to order, and but twenty were made during the last twelve months.

Rubber Patents, Trade Marks and Designs

Machinery Patents

United States

1,698,846.* INDIVIDUAL VULCANIZER. This invention concerns individual vulcanizers for rubber articles or wire that is coiled or wound up. It is intended to provide a vulcanizer adapted to facilitate handling of reels or coils of insulated wire, rubber hose, or tire flaps during the curing operation. Also it is to furnish an individual vulcanizer wherein the contents may be vulcanized in dry heat or surrounded by steam, air, inert gases, water or other fluids having special adaptability towards producing a uniform or accelerated cure. When operating, the air hoist lifts the upper mold section, and this is then latched automatically in place by spring-actuated dogs, engaging notches on the frame. After the object to be vulcanized has been placed in the mold, the latter is closed and clamped by bolts.—E. Hutchens, Milwaukee, assignor to Utility Manufacturing Co., Cudahy, both in Wis.

1,699,102.* HANDLING HOT MOLDS. This is a device for handling heated molds for tires and tubes, in which the mold can be moved by power.—W. L. Fairchild, New York, N. Y.

1,699,296.* TEMPERATURE REGULATOR. This is for the regulation of temperature of mandrels, or any other device that must be maintained at a constant temperature; for example, in the manufacture of cold pressed battery boxes.—T. M. Knowland and H. A. Hands, assignors to Hood Rubber Co., both of Watertown, Mass.

1,699,335.* TIRE REMOVER. This relates to a machine for pulling off solid tires from rims or wheels to which they have been cemented. It is for the purpose of removing all of the rubber at one operation.—H. Reichel, Chicago, Ill.

1,700,287.* RECLAIMING RUBBER. This invention covers procedure and suitable apparatus for refining reclaimed rubber by passing it through rolls in order to crush and plasticize small lumps or granules in the stock and reduce it to the same texture or consistency.—J. F. Fisher and W. R. Gillam, Phoenixville, Pa., assignors to The Philadelphia Rubber Works Co., Wilmington, Del.

1,701,082.* BLANK CUTTING MACHINE. A machine for dieing out rubber shoe uppers blanks from sheet stock. It comprises a reciprocable die, means for intermittently raising the die and holding it in raised position, means governed by the stock passing beneath the die for releasing it, and means actuated by the die in its operative stroke for assisting its return stroke, and in addition, an improved safety device for the purpose of preventing injury to an operator by the die.—E. L. Patten, assignor to L. Candee & Co., both of New Haven, Conn.

1,701,457.* TUBE CEMENTING DEVICES. This apparatus is for the purpose of cementing the ends of inner tubes when preparing them for splicing.—F. H. Tenney, assignor to The Firestone Tire & Rubber Co., both of Akron, Ohio.

1,701,464.* TIRE TESTING MACHINE. This is a device for testing automobile tires, particularly to determine whether the tire is in balance. A substantial base supports a vertical tube in the lower portion of which is a small cylinder, concentric with the tube. The piston of this cylinder, when actuated by compressed air or other fluid, forces upward a piston rod having a conical bearing member at the top. This member fits into a conically concave bearing in the center of the lower side of a holder or ring on which the tire to be tested is suitably secured. When pressure is admitted below the piston, the tire is raised and a circular spirit level, mounted on top of the hub of the center piece, at once indicates any unbalanced portion of the tire.—H. T. Kraft, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio.

1,698,717. REPAIR VULCANIZER. G. Degenring, Elizabeth, N. J.

1,698,883. TIRE WORKING TOOL. M. Henderson, Genthon, Manitoba, Canada.

1,699,282. GUM-STOCK DEFLECTOR FOR CALENDERS. J. H. Davidson, assignor to Hood Rubber Co., Watertown, Mass.

1,699,481. TUBE TESTING DEVICE. H. D. Stevens, assignor to The Firestone Tire & Rubber Co., both of Akron, O.

1,699,482. WIRE TWISTING DEVICE. W. C. Stevens, assignor to The Firestone Tire & Rubber Co., both of Akron, O.

1,699,489. CONVEYING SYSTEM. A. P. Lewis, assignor to The Miller Rubber Co., both of Akron, O.

1,699,600. FLUID PRESSURE BAG. G. W. Mann, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls, Mass.

1,699,953. COMBINATION HEELS. L. B. Conant, Cambridge, Mass., assignor to Standard Patent Process Corp., a corporation of Mass.

1,699,985. MACHINE FOR CROSS-SHEARING STRIPS. T. Mulholland, assignor, by direct and mesne assignments, to Valley Rubber Co., both of Wheeling, W. Va.

1,699,993. TUBE CLEANER. D. J. Rosensteel, Ebensburg, Pa.

1,700,099. ATTACHMENT FOR CALENDERS. J. A. Shively, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,700,367. LOCKING MECHANISM FOR VULCANIZERS. A. J. Fleiter, assignor to The Akron Standard Mold Co., Akron, O.

1,700,431. MECHANISM FOR VULCANIZING TIRES. W. B. Burke, E. Cleveland, assignor to The Electric Vulcanizing Rubber Co., Cleveland, both in O.

Dominion of Canada

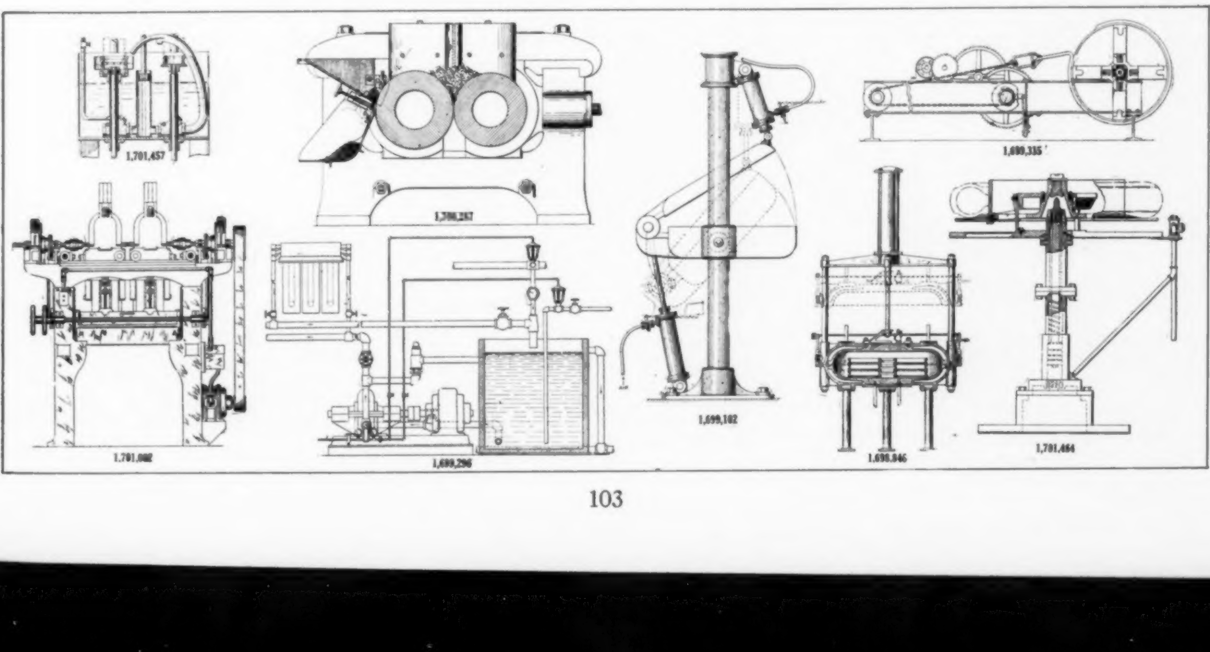
286,540. TUBE DEFLATING MACHINE. A. Schrader's Son, Inc., assignee of J. Wahl and O. Melzer, all of New York, N. Y., U. S. A.

286,608. AIRBAG. J. P. Holden, Toronto, Ontario.

286,691. RUBBER ARTICLE. The Dominion Rubber Co., Ltd., Montreal, Que., assignee of W. A. Gibbons, Great Neck, L. I., N. Y., U. S. A.

286,692. APPARATUS FOR INNER TUBES. The Dominion Rubber Co., Ltd., Montreal, Que., assignee of J. P. Coe, Detroit, Mich., U. S. A.

* Pictured in group illustration.



Rubber Patents, Trade Marks and Designs

286,800. Sectional Tire Core. W. J. Oakley, Brooklyn, N. Y., U. S. A.

United Kingdom

299,989. Inflatable Article Printing. C. Macintosh & Co., Ltd., and F. W. Warren, 2, Cambridge St., Manchester.

300,226. Regulating Temperature. Liverpool Rubber Co., Ltd., F. Amende and E. D. Griffiths, Walton Wks., Liverpool.

300,324. Molding and Shaping Tires. Dunlop Rubber Co., Ltd., 32, Osnaburgh St., London, H. Willshaw, W. A. Davis and H. Smith, Fort Dunlop, Erdington, Birmingham.

300,523. Machinery Guard. British Celanese, Ltd., 8, Waterloo Pl., London, and R. Martin of British Celanese, Spondon, near Derby.

300,544†. Tire. Goodyear Tire & Rubber Co., 1144 E. Market St., assignees of J. A. Shively, 1069 E. Market St., both of Akron, O., U. S. A.

300,625† Tire Shaping. Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, assignees of R. S. Kirk, Mogadore, both in O., U. S. A.

300,732. Printing Machine. R. E. Ellis, 70, Chancery Lane, London.—(Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, O., U. S. A.)

300,735. Sorting Golf Ball Centers. A. E. White, 88, Chancery Lane, London.—(B. F. Goodrich Co., New York, N. Y., U. S. A.)

300,944. Conveyer. C. W. Taylor, 146, Queens Rd., Watford, Hertfordshire.

300,945. Feeding Articles Automatically. E. B. Carter, 118 Riverway, Boston, Mass., U. S. A.

301,054† Tire. Goodyear Tire & Rubber Co., 1144 E. Market St., assignees of E. G. Templeton, 1568 Hillside Terrace, both in Akron, O., U. S. A.

301,104. Tire Mold Burner. A. Matthews, 36, Mighell St., Brighton.

301,324† Testing Strength of Fabrics and Rubber. F. Schubert, XVIII, Gentzgasse, Vienna.

301,372† Rubber Working Machine. F. H. Banbury, Ansonia, Conn., U. S. A.

301,476 and 301,477† Device For Making Tubular Rubber Articles. Soc. Italiana Pirelli, 21, Via Fabio Filzi, Milan, Italy.

Germany

470,201. Measuring Roll Temperature. Siemens-Schuckert werke A. G., Berlin-Siemensstadt, and Akkumulatoren-Fabrik A. G. Hagen, Westphalia.

470,414. Tire Vulcanizer and Shaper. The Dunlop Rubber Co. Ltd., London. Represented by Dr. R. Wirth, C. Weihe, Dr. H. Wei, M. M. Wirth, Frankfurt a. Main and T. R. Koehnhorn and E. Nool, Berlin S. W. 11.

470,773. Vulcanizing Press. Fried. Krupp Grusonwerk A. G., Magdeburg-Buckau.

Designs

1,057,989. Vulcanizing Apparatus. Sebastian Vilz, Singen a. Hohentwiel.

Process

United States

1,699,470. Tire Casing. A. E. Jury, Rutherford, N. J., assignor to Morgan & Wright, Detroit, Mich.

1,699,669. Vulcanized Shoe. C. H. Morrill, Swampscott, and S. F. Cushman, Beverly, both in Mass., assignors to United Shoe Machinery Corp., Paterson, N. J.

1,699,859. Dentures. J. C. Schwartz, St. Louis, Mo.; B. Schwartz and The Mercantile Trust Co. executors of J. C. Schwartz, deceased.

1,700,037. Brake Lining. R. J. Evans, assignor to Asbestos Mfg. Co., both of Huntington, Ind.

1,701,472. Fabric Band Shaping. R. P. Dinsmore, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

Dominion of Canada

286,718. Electrical Condenser. The Radio Patents Corp., New York, assignee of A. Nyman, Dobbs Ferry, both in N. Y., U. S. A.

United Kingdom

299,982. Electric Cable. R. F. Bruce, 18, Heathview Rd., Thornton Heath, Surrey, and Saxonia Electrical Wire Co., Ltd., Roan Wks., Greenwich, London.

300,764. Coating Process. Walker, Hunter & Co., Ltd., and J. Walker, Port Downie Ironworks, Falkirk.

301,302† Football. Z. Von Fay, A. Gebhardt, T. Molnár, and E. Szüsz, 7, Vilmos Császár Utca, Budapest, assignees of S. Bognar, Vácz, Hungary.

Germany

470,270. Producing Rubber Objects By Heating Plastic Masses. Axel Teodor Gustafson, Goteborg, Sweden. Represented by B. Bomborn, Berlin S. W. 61.

470,333. Producing Footwear. H. C. L. Dunker, Helsingborg, Sweden. Represented by Dr. G. Lotterhos, Frankfurt a. Main.

Chemical Patents

United States

1,698,712 to 1,698,715 Inclusive. Vulcanization Control. This group of patents relate to a process for controlling the vulcanization of rubber which comprises treating vulcanized rubber containing an accelerating ingredient with a material to check the functioning of the latter.—S. M. Cadwell, Leonia, N. J., assignor to The Naugatuck Chemical Co., Naugatuck, Conn.

1,699,368 and 1,699,369. Preserving Rubber Latex and Product. Latex is heated with a sulphonic alkyl aryl reaction product and formaldehyde to furnish a stable uncoagulated latex.—John McGavack, Jackson Heights, N. Y., and Roy A. Shive, Bellemoor, Del., assignors to The Naugatuck Chemical Co., Naugatuck, Conn.

1,700,778. Paint and Varnish Liquid. C. M. A. Stine, Cole Coolidge, E. B. Middleton, assignors to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

1,700,779. Coating Composition. C. M. A. Stine and J. E. Booge, assignors to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

1,701,129. Hard Rubber Coating. S. E. Sheppard and J. J. Schmitt, assignors to Eastman Kodak Co., all of Rochester, N. Y.

Dominion of Canada

286,558. Insulating Material. Two mixtures of rubber and sulphur are prepared in different proportions respectively. These are heated separately to a temperature above that required to produce vulcanization for producing compounds having suitable thermoplastic properties and the compounds are then mixed.—The Western Electric Co., Inc., New York, N. Y., assignee of A. R. Kemp, Westwood, N. J.

286,702. Factice. A synthetic product prepared from oil from the shell of the cashew nut having the characteristic appearance and resiliency of natural rubber.—The Harvel Corp., assignee of Mortimer T. Harvey, both of Newark, N. J.

United Kingdom

300,208.† Accelerator. An alicyclic base or derivative or compound thereof is used as a vulcanization accelerator.—I. G. Farbenindustrie A. G., Frankfort-on-Main, Germany.

300,287. Accelerator. These are produced from the condensation products of aldehydes and amines, known as Schiff's bases, or the aldehyde derivatives of such bases by treating them with an acid and then reacting the product with further aldehyde or carbon disulphide.—E. C. R. Marks, 57 Lincoln's Inn Fields, London. (Rubber Service Laboratories Co., Akron, O.)

300,719. Coagulating Latex. Rubber is coagulated from latex by proteases in the presence of additional substances facilitating the reaction or improving the properties of the rubber, such as hydrocyanic acid, hydrogen sulphide or saline mixtures possessing buffer properties.—J. Y. Johnson, 47 Lincoln's Inn Fields, London. (I. G. Farbenindustrie A. G., Frankfort-on-Main, Germany.)

300,936. Transparent Rubber. A zinc or cadmium salt of an organic fatty acid, such as stearic, palmitic, oleic or linoleic acid, is included in the mix prior to vulcanization. Example mix contains 95.5 per cent pale crepe rubber, 2 per cent sulphur, 2 per cent zinc stearate, and 0.5 per cent zinc diethyl dithiocarbamate.—C. Macintosh & Co., Ltd., S. A. Brazier, and E. H. Hurlston, 2 Cambridge street, Manchester.

301,077.† Treating Latex. Solution of haemoglobin and small quantities of zinc oxide are added to latex and the mixture heated to 75 to 100°F. to produce a thick latex in which fillers are suspended.—Rubber Latex Research Corp., 80 Federal st., Boston, Mass.

301,085.† Latex Treating. Suspended impurities are removed from rubber latex by centrifuging after the addition of the preservative materials so that the precipitated materials are also removed.—Aktiebolaget Separator, 8 Fleminggatan, Stockholm, Sweden.

299,974 and 299,975. Molding by Dipping.—Dunlop Rubber Co., Ltd., London, D. F. Twiss and E. A. Murphy, Fort Dunlop, Eng.

†Not yet accepted.

300,008. Rubber Cement.—H. Beckman 26, Albertinenstrasse, Zehlendorf, Berlin.
300,167.† Synthetic Rubber.—I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany.
300,357. Flexible Tubing.—A. S. Gregg, 22 Park Crescent, Finchley, Eng.
300,394 and 300,456. Preserving Latex.—J. Y. Johnson, 47 Lincoln's Inn Fields, London (I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany).
300,924.† Shoe Filler.—I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany.
300,949.† Accelerator.—Goodyear Tire & Rubber Co., assignee of J. Teppema both of Akron, O.
301,024.† Coated Fabric.—E. I. du Pont de Nemours & Co., Wilmington, Del., assignee of M. N. Nickowitz, Fairfield, Conn.
301,100. Electrodeposition. — Dunlop Rubber Co., Ltd., London, and D. F. Twiss, Fort Dunlop, Eng.
301,195. Cork & Rubber Mats.—H. E. Deane, 41 Alexandra Grove, London, Eng.
301,300.† Coating Metal.—Anode Rubber Co., Ltd., assignee of Anode Rubber Co. (England), both in England.
301,367. Sheet Rubber.—Dunlop Rubber Co., Ltd., London, R. F. McKay and W. H. Chapman, Fort Dunlop, Eng.
301,515† Synthetic Rubber.—I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany.
301,516† Color Screen.—Soc. Lumiere, 82, Rue de Rivoli, Paris, France.

Germany

470,579. Hard Rubber from Acetyl Cellulose. Dr. Gustaf Leysieffer, Troisdorf b. Koln a. Rh.

General

United States

January 15, 1929*

1,698,791. Heel. J. B. Hadaway, Swampscott, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.
1,698,956. Air Pressure Controller. M. J. McAneny, assignor to J. L. Goree, both of Denver, Colo.
1,699,137. Artificial Tooth Fastener. H. Estelmann, Nuremberg-Eibach, Germany.
1,699,225. Tire. B. Corona, Santiago de Cuba, Cuba.
1,699,366. Pneumatic Tire Signal Device. J. H. Loeb, Morgan City, La.
1,699,378. Tire Inflating Apparatus. H. E. Smith, assignor of one-half to W. E. Richter, both of Tacoma, Wash.
1,699,453. Brace and Trouser Support. G. A. Smith, assignor to B. M. Roberts, both of Long Beach, Calif.
1,699,472. Athletic Shoe. F. P. Lundy, White Plains, N. Y., assignor to National India Rubber Co., Bristol, R. I.

January 22, 1929*

1,699,614. Coin Purse. D. Fairbairn, Amityville, N. Y.
1,699,718. Revolving Grizzly. T. Robins, New York, N. Y., assignor to Robins Conveying Belt Co., Passaic, N. J.
1,699,850. Storage Battery Container. E. Lyndon, New York, N. Y.
1,699,923. Undergarment. A. Rothstein, Chicago, Ill.

*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

Rubber Patents, Trade Marks and Designs

1,699,965. Ampullar Container and Applicator. C. J. S. Herzog, New York, N. Y.
1,700,014. Tire Reliner. S. Armata, Goose Creek, Tex.
1,700,025. Milking Machine Teat Cup. W. R. Cockburn, Otahuhu, assignor of one-half to A. H. O'Leary, Auckland, both in N. Z.

January 29, 1929*

1,700,401. Fountain Pen Filler. F. B. Chamberlin, Columbus, O.

February 5, 1929*

1,700,746. Rod or Stem Packing. F. H. Pike, assignor, by mesne assignments, to The General Asbestos & Rubber Co., both of Charleston, S. C.
1,700,999. Driving Belt. A. L. Freedlander, assignor, by direct and mesne assignments, of three-fourths to The Dayton Rubber Mfg. Co., and one-fourth to General Motors Research Co., all of Dayton, O.
1,701,018. Heel Protector. E. E. Smart, Mineral Wells, Tex.
1,701,228. Tire Gage. C. H. Deren, assignor to O. E. Tepe, both of Brooklyn, N. Y.
1,701,260. Sole Pad for Shoes. W. Fischer, New York, N. Y.
1,701,269. Foot Arch Support. J. May, Frankfort-on-the-Main, Germany.
1,701,311. Tire Alarm. J. M. Scott and W. L. Dayton, Fort Worth, Tex.
1,701,406. Invisible Sole Attachment. C. Furcolo, assignor of one-half to G. Piscirillo, both of Philadelphia, Pa.
1,701,421. Clinical Nozzle. E. G. Ponti, Turin, Italy.
1,701,482. Tire Tread. H. C. Hower, Chicago, Ill.

Dominion of Canada

January 8, 1929

286,193. Tire Boot. M. P. Cole, Goodland, Kan., U. S. A.
286,364. Tire Casing Filler. J. Allegre and J. Perez, assignees of half the interest, both of Tuolumme, Calif., U. S. A.

January 15, 1929

286,421. Syringe. L. F. Novak, Jersey City, N. J., U. S. A.
286,517. Tire Inflating Nozzle. The Korect Air Meter Corp., assignee of V. H. Gile, both of Buffalo, N. Y., U. S. A.
286,541 and 286,542. Pressure Gage. A Schrader's Son, Inc., assignee of J. Wahl and O. Melzer, all of New York, N. Y., U. S. A.

January 22, 1929

286,660. Paving Block. E. C. Wallace, Newton, Mass., U. S. A.
286,693. Pressure Hose. The Dunlop Tire & Rubber Goods Co., Ltd., assignee of G. A. Ansell, both of Toronto, Ontario.
286,701. Raft or Boat. The Firm Gustav Winkler, assignee of H. Meyer, both of Berlin, Germany.
286,714. Pneumatic Tube. The Niagara Rubber Goods Ltd., Beamsville, assignee of R. Van Dyke, Grimsby, both of Ontario.

January 29, 1929

286,818. Non-skid Link. D. M. Weigel, Akron, O., U. S. A.

United Kingdom

December 31, 1928

299,956. Surgical Syringe. E. A. Weitz, 9, Heuberg, Hamburg, Germany.
300,081. Valve. J. B. Fleming, Towson Heights, Baltimore, Md., U. S. A.
300,098. Tire. M. Ungár, 267, Bécsi-Ut, Budapest, Hungary.
300,212† Writing Pad. Laufer Gummiwarenfabrik Schwerdt & Renner, 48, Grosse Barlinge, Hanover, Germany.
300,255† Toy. H. Schein, Sentinel House, Southampton Row, London.

January 9, 1929

300,319. Paving. Hazel Grove Rubber Co., Ltd., and T. Gare, Bramhall Moor Lane, Hazel Grove, Stockport.
300,355. Motor Vehicle. W. Clarkson, 21, Alton St., E., Crewe.
300,421. Case for Soap-Sticks. E. L. Bower, 18A Gwendwr Rd., W. Kensington, London.
300,428. Golf Accessory. C. A. Smith, Pres. Harding Apts., Flushing, L. I., N. Y., U. S. A.
300,472. Boot. A. A. Glidden, 65 Adams Ave., Watertown, and F. R. McKenzie, 62 Hobson St., Brighton, both in Mass., U. S. A.
300,476. Printing Machine. C. Winkler, 35, Wylerringstrasse, Berne, Switzerland.
300,521. Boot. J. H. Mosey, Norlands, Cross Lane, Burniston Rd., Scarborough.
300,556†. Stocking Suspender. T. Siegert, (née Kaever), 17, Teutoburgerstrasse, assignee of W. Siegert, 7, Hubnerstrasse, both of Dresden, Germany.
300,642† Tire. S. P. Pardo, 213, Còrcega, Barcelona, Spain.

January 16, 1929

300,712. Testing and Stamping Eggs. J. J. Sampson, 35, Aungier St., and A. Carton, 17, Halston St., both in Dublin.
300,772. Printing. D. W. E. Kyle, 31, Riverview Grove, Chiswick, London.
300,882. Rock Drill. Ingersoll-Rand Co., 15, Exchange Pl., Jersey City, N. J., U. S. A.
300,906† Pipe Joint. Eternit Pietra Artificiale Soc. Anon., 8, Piazza Corridoni, Genoa, Italy.
300,999. Tire. E. B. Killen, 27, Queen Victoria St., London.
301,007. Upholstery Stuffing Material. G. W. Melland, Min-Y-Don Hall, Old Colwyn, and P. Gray, New Holme, Gladys Grove, Colwyn Bay, both in Denbighshire.
301,089† Tank. Soc. Italiana Pirelli, 21, Via Fabio Filzi, Milan, Italy.

January 23, 1929

301,215. Motor Vehicle. Sir H. Austin, Lickey Grange, Bromsgrove, Worcestershire.
301,269. Vacuum Cleaning Apparatus. A. Bode, (née Kruse), 17, Ratsmühlendamm, Fuhlsbüttel, Hamburg, Germany.
301,274. Powder Blower. R. Lex, 61, Ubierring, and K. Zeyen, 87, Friesenwall, both in Cologne, Germany.

† Not yet accepted.

Rubber Patents, Trade Marks and Designs

301,351. GAITER. J. Clewlow, 45, May Pl., Fenton, Stoke-on-Trent.

301,373† SOAP HOLDER. W. Vernet, 229 E. 38th St., New York, N. Y., U. S. A.

301,409. DRAUGHT EXCLUDER. T. Chadwick, Fells View, Isle of Man, Ramsgreave, near Blackburn.

Germany

470,373. TIRE COVER. Marie Nicholas Albert Develay, Paris. Represented by J. Schmetz and L. Schmetz, Boxgraben 47, Aachen.

470,412. CABLE CHAIN. Continental Caoutchouc und-Gutta-Percha Compagnie, Hannover.

470,474. CUSHION TIRE. Mathias Mohr, Untermainkai 31, Frankfurt a. Main.

470,478. HEEL. Percy H. Letchford, Winnipeg, Canada. Represented by P. Breddin, Cologne.

470,890. CUSHION TIRE. Edward Brice, Killen, London. Represented by B. Kugelmann, Berlin S. W. 11.

Designs

1,055,892. WATCH PROTECTOR. Artur Soika, Tarnowitzerstrasse 8, Gleiwitz.

1,055,914. TIRE PROTECTOR. Gotthilf Roller, Mittenwalderstrasse 7, Berlin S. W. 29.

1,056,095. SINK BUFFER. Agnes Metzdorf, nee Koch, Schonhauser Allee 89, Berlin N. 113.

1,056,112. HOSE. C. Vollrath & Sohn, Komm. Ges., Bad Blankenburg, Thur. Wald.

1,056,222. ELASTIC WEBBING. Halstenbach & Co., Nordstrasse 50, Barmen.

1,056,362. LATEX PAN. H. & A. Gratenau, Monckebergstrasse 5, Hamburg.

1,056,363. WASTE RUBBER ARTICLE. The Dunlop Rubber Co., Ltd., London. Represented by Dr. R. Wirth, C. Weihe, Dr. H. Weil, M. M. Wirth, Frankfurt A. Main, and T. R. Koehnhorn, and E. Noll, Berlin S. W. 11.

Trade Marks

United States

Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section (1) (b) are nontechnical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the later act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

January 15, 1929

Act of February 20, 1905

251,785. HAZACODE—insulated wires and cables. The Okonite Co., Passaic, N. J.

251,857. DOUBLE EAGLE—pneumatic tires, nonskid devices, tire protectors, tire and tube repair outfits, repair patches and bandages. The Goodyear Tire & Rubber Co., Akron, O.

† Not yet accepted.

251,863. AIRMATIC—tires. Raritan Rubber, Inc., New Brunswick, N. J.

Act of March 19, 1920

251,909. Representation of a section of a tire containing the words: "MARTIN CORD"; beneath the representation the words: "MARTIN CUSTOM BUILT CORD TIRES"—tires and tubes. Custom Built Tire Corp. of America, New York, N. Y

January 22, 1929

Act of February 20, 1905

251,997. TENAFIRMA—carpet lining of rubber treated material. Allon Skipsey, St. Albans, Eng.

252,013. Circle containing the representation of a pelican, beneath the representation the word: "PELIKAN"—erasers, fountain pens, etc. Günther Wagner, Hanover, Germany.

252,102. MIRACLE—hot water bottles. Harry LeRoy Crooker, Philadelphia, Pa.

Act of March 19, 1920

252,143. Circle containing the words: "KANT KRAK"—sheet composition rubber. Rubin Bros. Footwear, Long Island City, N. Y.

252,151. RUBBER-ALL—overall garments. Meyer Reingold, doing business as The Rubber-All Co., New York, N. Y.

January 29, 1929

Act of February 20, 1905

252,232. "O'BANNON" and "FLEECE"—raincoats, etc. The Henry Sonneborn Co., Baltimore, Md.

252,282. "GRAY DAY"—raincoats. J. C. Haartz Co., New Haven, Conn.

February 5, 1929

Act of February 20, 1905

252,320. Oval containing the words: "M. W. IMPS"—prophylactic rubber articles. P. V. Lucas, doing business as Medical Sundries Co., Dallas, Tex.

252,324. Circle containing the letters: "MM"; above the circle the word: "BIRDIE"—golf balls. May & Malone, Chicago, Ill.

252,343. "EXCELSIOR"—animals, dolls and balls. Hanover Rubber Co. "Excelsior", Inc., New York, N. Y.

252,344. "SENIOR"—golf balls. Gamble Stores, Inc., Fergus Falls, Minn.

252,380. Circle containing the representation of a bird, beneath the representation the word: "ORIOLE"—golf and tennis balls, etc. The P. Goldsmith Sons Co., Cincinnati, O.

252,396. Representation of a man, beneath the representation the word: "HEALTH-WAY"—heels. Bradstone Rubber Co., Woodbine, N. J.

252,397. Representation of a three pointed star, beneath the representation the word: "BRASTOCO"—heels. Bradstone Rubber Co., Woodbine, N. J.

252,426. "VINEGAIRE TAR"—product derived from wood by distillation and used for compounding with rubber. R. T. Vanderbilt Co., Inc., New York, N. Y.

252,450. "BLUE RIBBON"—combs of hard rubber, etc. P. B. T. Williams, Philadelphia, Pa.

252,462. "LAFLEX"—shoe soles. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.

252,465. "SEAWALL"—tube patching for tire, tube and hose repair. R. C. Edwins, Gulfport, Miss.

252,469. "ARCHCREST"—shoes of leather, fabric, rubber, etc. McCain-Wright, Inc., St. Louis, Mo.

Dominion of Canada

January 8, 1929

45,400. Oval portrait in pen and ink of Thom McAn, a little to the right center of the oval, with the name: "THOM MCAN" in script against a rectangular white background and running horizontally across the picture near the bottom—shoes of leather, rubber, fabric, etc. Melville Shoe Corp., New York, N. Y.

January 15, 1929

45,404. Words: "THOM MCAN"—shoes of leather, rubber, fabric, etc. Melville Shoe Corp., New York, N. Y.

45,408. Words: "BIG FOUR"—shoe heels. Melville Shoe Corp., New York, N. Y.

45,423. Letter: "F" within a red, shield like device—tires, inner tubes, tire accessories, etc. Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont.

January 22, 1929

45,430. Words: "BLUE RIBBON"—rubber goods and articles. Dominion Rubber Co., Ltd., Montreal, Que.

United Kingdom

January 2, 1929

495,996. "SANTIES"—rubber lined knickers. Reliance Rubberware, Ltd., 39, Aldersgate St., London, E. C. 1.

497,223. "EDLA"—all goods included in Class 38. The Dela Rubber Co., Ltd., 2, Cambridge St., Manchester.

January 9, 1929

494,143. "B & H"—rubber straps and elastic, bath and surgical gloves. Bourne & Hollingsworth, Ltd., 11, Wells St., London, W. 1.

494,159. "B & H"—insulating gloves, imitation sponges, hot water bottles, bath mats, sponge bags and dress shields. Bourne & Hollingsworth, Ltd., 11, Wells St., London, W. 1.

January 16, 1929

492,253. Square containing fancy design and the letters: "N. G. P. M."—rubber and gutta percha goods. Nederlandsche Gutta Percha Maatschappij, Anna Paulownastraat 95, The Hague, Holland.

493,775. Representation of a man, above the representation the word: "VULCAN"—rubber chests, etc. Brooke, Bond & Co., Ltd., Calcutta House, Goulston St., Aldgate, London, E. 1.

497,410. "WIZARD"—protectors for the soles and heels of boots and shoes. Fussell's Rubber Co., Ltd., Knightstone Mills, Moor Lane, Worle, Weston-super-Mare.

January 23, 1929

493,507. "ARC"—bicycle tires and tubes. The Avon India Rubber Co., Ltd., Rubber Works, Bath Rd., Melksham, Wiltshire.

494,584. "GLORIA"—garters and hose supporters. Luke Turner & Co., Ltd., Deacon St. Works, Grange Lane, Leicester.

497,123. "DAITAN"—boots and shoes. The Harboro' Rubber Co., St. Mary's Mills, St. Mary's Rd., Market Harborough, Leicestershire.

497,881. "ARTEMIS"—erasers, etc. George Rowney & Co., Ltd., 10-11 Percy St., Tottenham Court Rd., London, W. 1.

MARKET REVIEWS

CRUDE RUBBER

New York Exchange

TRANSACTIONS on the Rubber Exchange from January 30 to February 21 were 21,570 lots or 53,925 tons compared with 26,047 lots or 65,118 tons, December 24 to January 26, 1929, inclusive.

Prices at the start of the week of February 4 were down about ¾ cent from close of last week's Friday, February 1, and Saturday, February 2, prices, due to the announcement that leading tire manufacturers would make further adjustment in tire prices, effective at once, which caused more or less of an unsettled condition in the rubber trade.

As the week progressed prices moved in a narrow range and closed ¼ cent over Monday's level. Spot ribs on "A" contracts February 8 closed at 21.90 cents; "A" contract futures closed as follows: February, 21.80 cents; March, 21.90 cents; April, 22.10 cents; May, 22.30 cents; June, 22.50 cents; July, 22.60 cents; August, 22.80 cents; September, 22.90 cents; October, 22.90 cents; November, 23.00 cents; December, 23.00 cents; January, 23.10 cents.

Monday, February 11 the market opened very quiet due to the approaching Holiday on Tuesday, and also on account of the fact that Singapore was closed for two days, due to Chinese New Year. Therefore, there was little disposition by dealers or factories to operate although buying orders were in evidence at slightly lower levels, on both the Exchange and the outside market.

After the opening on Wednesday, bullish demonstrations were apparent in all markets, particularly in the New York market where urgent buying was evident for all positions, with the bulls carrying up prices ¾ of a cent, which established a new high record, with December and January positions crossing the 24 cent level. It was reported from the London market that heavy speculative buying together with short coverings and dealers buying caused this advance.

When the Rubber Association report of a monthly consumption for January of 43,002 tons, a new high for all times, was announced, ribs rose to 23 cents for spot, with further advances of 20 to 30 points on all Exchange positions, although the actual realization of these high consumption figures were not in evidence until Friday when both Singapore and London advanced practically a full cent.

This bullish news from foreign markets caused all C I F foreign offers to be taken up by dealers and further urgent covering to be made by shorts, which resulted in new high prices for all deliveries to over 25 cents and in the position from July to December to over 26 cents.

Spot ribs on "A" contracts closed February 16 at 25.00 cents; "A" contracts closed as follows: February, 25.00 cents; March, 25.00 cents; April, 25.30 cents; May, 25.60 cents; June, 25.70 cents; July, 25.80 cents; August, 25.90 cents, September, 25.90 cents; October, 26.00 cents; November, 26.10 cents; December, 26.10 cents; January, 26.30 cents.

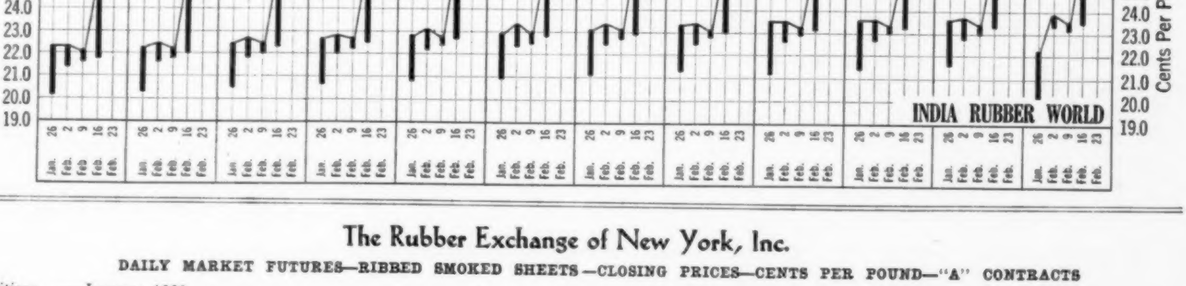
The market of Saturday, February 16, was an evening up affair, but at that, few dealers dared to go away over the week end with short lines out, while others took profits with the result that the market seesawed back and forth and closed at about Friday's levels. It might be said that this week was the most active on the Rubber Exchange since the lifting of the English rubber restriction. Prices advanced over 3 cents during the week, and, on Friday, February 15, when opening prices were 60 points over the previous close, the trading was simply hectic during the first hour when a record volume of 1,679 lots equivalent to 4,197.5 tons was made.

Prices continued to advance during the day to new high records for all positions showing increases of 220 to 230 points over the previous close, while the volume of transactions were 3,762 lots equivalent to 9,405 tons, second only to the record day, January 11, 1929, when 3,887 lots changed hands.

Consumption of rubber during January was 43,002 tons which exceeded all previous months. This compares with 31,232 tons during December and 34,403 tons during January, 1928, which shows an increase of nearly 40 per cent over the estimated consumption.

The Department of Commerce has is-

New York Rubber Exchange—High and Low Monthly Futures



The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLOSING PRICES—CENTS PER POUND—"A" CONTRACTS

Positions 1929	Jan. 28	Jan. 29	Jan. 30	Jan. 31	Feb. 1	2	4	5	6	7	8	9	11	12*	13	14	15	16	18	19	20	21	22*	23*
February	22.0	21.5	21.4	22.0	22.3	21.7	21.6	22.1	21.9	21.8	21.8	21.9	21.8	....	22.5	22.8	25.2	25.0	25.2	25.0	24.9	...	....	....
March..	22.1	21.6	21.6	22.1	22.4	21.8	21.8	22.2	22.0	21.9	21.9	21.9	22.0	....	22.7	22.9	25.2	25.0	25.3	25.0	24.9	25.0	....	....
April....	22.3	21.8	21.8	22.4	22.6	22.0	22.0	22.5	22.2	22.1	22.1	22.2	22.3	....	23.0	23.1	25.4	25.3	25.5	25.3	25.1	25.3	....	....
May....	22.5	22.0	22.0	22.5	22.8	22.4	22.2	22.7	22.4	22.3	22.3	22.4	22.5	....	23.3	23.3	25.6	25.6	25.6	25.6	25.3	25.6	....	....
June....	22.7	22.2	22.2	22.7	23.1	22.6	22.4	22.8	22.6	22.5	22.5	22.6	22.7	....	23.4	23.4	25.7	25.7	25.8	25.7	25.4	25.7	....	....
July....	22,9	22.4	22.3	22.9	23.3	22.7	22.5	23.0	22.8	22.6	22.6	22.8	22.8	....	23.5	23.5	25.7	25.8	26.0	25.7	25.4	25.8	....	....
August..	23.0	22.5	22.5	23.0	23.4	22.8	22.7	23.1	22.9	22.8	22.8	22.9	22.9	....	23.6	23.7	25.8	25.9	26.1	25.8	25.5	25.9	....	....
September	23.1	22.5	22.6	23.1	23.4	22.9	22.8	23.1	22.9	23.0	22.9	23.0	23.0	....	23.7	23.8	25.9	25.9	26.2	25.9	25.6	26.0	....	....
October..	23.2	22.6	22.7	23.2	23.5	23.0	22.9	23.2	23.1	23.0	22.9	23.1	23.1	....	23.8	23.9	26.0	26.0	26.4	26.0	25.7	26.0	....	....
November	23.3	22.7	22.8	23.3	23.6	23.1	23.0	23.3	23.2	23.1	23.0	23.2	23.2	....	23.9	24.0	26.1	26.1	26.5	26.1	25.8	26.1	....	....
December	23.3	22.7	22.8	23.3	23.7	23.2	23.1	23.4	23.3	23.2	23.0	23.3	23.3	....	24.0	24.1	26.2	26.1	26.5	26.3	25.9	26.4	....	....
1930 January..	...	...	...	...	23.8	23.3	23.2	23.5	23.4	23.3	23.1	23.4	23.4	....	24.1	24.2	26.3	26.3	26.6	26.3	26.0	26.5	....	....

*Holiday.

sued revised figures for net imports to the United States during 1928 which are 407,573 tons as against 398,483 tons for 1927. Imports during January at all ports in the United States amounted to 52,305 tons, as compared with 46,840 tons the previous month and 46,200 tons during January, 1928. The arrivals from February 1 to 15 inclusive, are estimated at 34,100 tons.

On Monday, February 18, a rather irregular and nervous market was noted at the outset of the week caused by a sharp upswing in London which encouraged good buying and covering locally with gains of one-half to three-quarters of a cent. Good absorption and general bullish activities forced values upwards, but on the bulge a wave of selling orders and profit taking appeared in the ring and values yielded with the amount of offerings. A further slump in London caused late selling on the down turn, more urgent buying appeared bringing about another rally of a firm close. It was also reported that another failure in London helped bring about the advance abroad. Sales were 2,162 lots or 5,415 tons.

Tuesday, February 19, trading in futures began to go down a little and was rather an uninteresting affair compared to last week. Prices fluctuating in a rather narrow range of about ½ cent selling up one moment and down the next, yet on every decline large trade interests and commission houses were quietly picking up good quantities, especially, May, July and September positions. March seems to have been held around the 25 cents level, with large orders at 24.80 and 24.90 and enough to sell at 25.00 cents to hold the price, yet at times good quantities are taken at 25 cents. It was noted that pool interests at times depressed the future positions in order to weaken March, where there are always buying orders on any weakness.

In summarizing the month it might be said that in February for years past it has been a dull and drab month, while this February has been one of records, rapid advances, sharp declines and hectic excited trading.

Thursday, February 21, the market closed for the week, due to Washington's Birthday and also Saturday, as a holiday was voted by the Exchange. Operations opened 40 points higher on practically all positions due to higher London cables and few offerings from the East. Trading was much quieter, especially, as some operators had already left town, however, there was little disposition to even up holdings. During the afternoon there were temporary declines of from 30 to 40 points, but in the closing hour renewed support from manufacturer's representatives and trade sources caused another upward movement, and the final tone was firm.

Closing prices were as follows: Spot 25.10 cents; trading in February ceased at 12 noon, with a price of 25.20 cents; March, 25.00 cents; April, 25.30 cents; May, 25.60 cents; June, 25.70 cents; July, 25.80 cents; August, 25.90 cents; September, 26.00 cents; October, 26.00 cents; November, 26.10 cents; December, 26.40 cents; January, 26.50 cents.

Geo. H. McFadden & Bro. state that stocks in London have not increased as fast as anticipated, and this fact has added to the force behind the recent upward swing of prices. The most remarkable feature, however, is that all the primary markets in the Far East, particularly Singapore, have steadily kept above both London and New York, which situation has not permitted importers to sell rubber for nearby deliveries and replace it at a profit with purchases in the Far East for shipments for a later period.

New York Outside Market

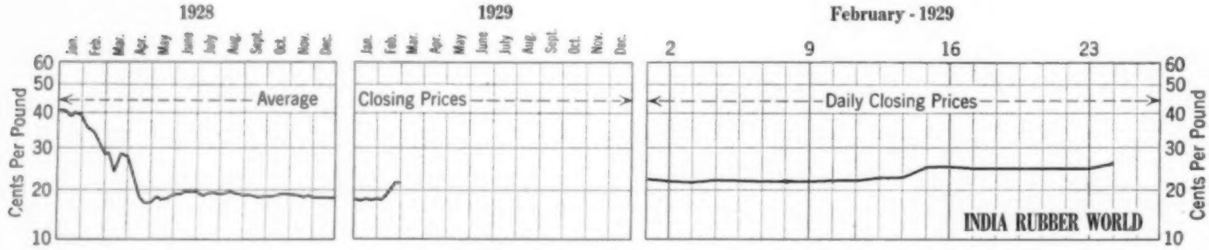
With standard ribs selling at 22¼ cents at the close of January, 1929, many manufacturers who had bought a fair quantity of crude rubber around the 18½ and 19 cent level believed that a 4 cent advance was more than enough due to the estimated heavy arrivals for January and although they were continually nibbling at fair quantities for the April, June and July, September positions, they were not anxious to follow any further advance, especially, with the announcement that leading tire dealers were to make further adjustment in the tire prices. This, however, was later found to be neglible as there were cuts in some sizes and advances in others.

Some interesting forecasts were made by Eric Miller, at the annual meeting of the United Serdang Co., who estimated World consumption of crude rubber in 1928 at 680,000 tons against 590,000 tons in 1927. He expects consumption to be well over 700,000 tons in 1929 and also looks for further contraction of available stocks following the 30,000 tons reduction in 1928. He believes World stocks today are no more than a minimum necessary for comfort at the existing demand rate, and that there is no prospect of any material increase in annual output of the planted European owned estates. As to native area their production is mere guesswork.

As the week of February 4 opened, prices were still quiet and steady, and factories continued to hold off, for any large quantities but were willing to accept any cheap offer, especially for the future positions.

At the beginning of the week of February 11, manufacturers still held back with the Holiday approaching and preferred to wait out the market. They also desired to wait for the publication of the Rubber Association figures for January consumption, which when they appeared were a surprise to all and very bullish. After the full realization of these figures the factories not only wanted rubber for all positions but paid current prices, and their support also

New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets



New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

Plantations	Jan. 28	Jan. 29	Jan. 30	Jan. 31	Feb. 1	2	4	5	6	7	8	9	11	12*	13	14	15	16	18	19	20	21	22*	23*
Sheet																								
Ribbed smoked	21⅞	21⅝	21⅝	22⅛	22½	22	21¾	22¼	22⅛	22	22	22	22⅛	....	22⅞	23	25⅜	25½	25⅜	25⅛	25	25¼	....	....
Crepe																								
First latex	22¼	22	22	22½	22¾	22⅜	22	22½	22½	22⅜	22¼	22⅜	22⅝	....	23¼	23¼	25¾	25⅞	25⅝	25⅝	25⅜	25½	....	....
"B" blanket	20⅝	20¼	20	20⅜	20¾	20⅜	20½	20½	20⅝	20½	20½	20½	20½	....	21¼	21½	23⅝	23¾	23⅝	23½	23	23¼	....	....
"C" blanket	20⅜	19⅞	19¾	20¼	20½	20⅛	20¼	20⅜	20⅝	20¼	20¼	20¼	20¼	....	21	21¼	23⅜	23½	23⅜	23¼	22¾	23	....	....
"D" blanket	20	19½	19⅜	20	20⅛	19¾	20	20	20	20	19¾	19¾	19⅞	....	20⅝	20⅞	23	23⅛	22⅞	22⅞	22½	22¾	....	....
No. 2 brown	20⅜	19⅞	19¾	20¼	20½	20⅛	20⅛	20⅜	20⅜	20⅛	20¼	20¼	20¼	....	20⅞	21¼	23⅜	23⅜	23¼	23¼	22¾	23	....	....
Rolled brown	16⅜	16⅛	16⅛	16½	16⅞	16¾	16⅝	17	17	16¾	16⅝	16¾	16¾	....	17¼	17¼	18½	18⅝	18⅝	18⅝	18⅜	18⅝	....	....
Off latex	21⅞	21¾	21⅝	22¼	22½	22⅛	21¾	22¼	22¼	22	22	22	22¼	....	23	23⅛	25⅜	25½	25⅜	25⅛	25⅛	25⅛	....	....

*Holiday.

strengthened prices as dealers took all C I F offers and bid for more.

Monday, February 18, with the advance in London and on the local Exchange, American factories were again reported to be good buyers in the Far East, although offerings from first hands were few and held at high prices.

Pool interests were buyers for nearbys, and it was intimated that they were buyers for large factories who did not dare to show their hands, while small factories who had not bought were continually bidding under the market and were very nervous. Optimistic advices came in from the mid-west and some opinions were expressed that a continued heavy consumption would be reported for February in spite of the less number of working days, and in March the record consumption of January of 43,000 tons would be equaled or exceeded.

Spot ribs were quoted at 25½ cents, with first latex crepe at 26¼ cents, and crepe scarce at that.

As the period of February 18 to 21 advanced, the market quieted down a little, due to the approaching Holiday, and prices receded about ¼ cent. However, the impression remains in trading quarters that the bull movement is by no means over and we are apt to see rapid price fluctuations in both directions, nevertheless, the trend of values for the present is upwards.

Sentiment has not changed to any extent, and bulls, sold out on the recent advance, are standing by, waiting a good break in order to repurchase their stocks. This, however, is very difficult as the eastern markets are tight. Offers were for small quantities and when taken up and further bids made, prices were advanced to unworkable figures.

Manufacturers have been in the market all the week for actual rubber and have made fair purchases, yet dealers were sparing in their sales as it was so difficult to replace rubber in the primary markets.

One factor that has been overlooked by the factories and trade in general is the fact that during the restriction years rubber plantations have always had a surplus stock of rubber to ship during the winter months, when the rubber trees are wintering and tapping is very light. However, this year about all the surplus rubber was shipped on the lifting of restriction, and now with the light tapping, due to wintering trees, shipments during February, March, April and May may surprise many by their smallness and cause a real scarcity for May, June and July rubber.

At the close of the week of February 21, due to the approaching Holiday, factory demand was at a standstill and dealers simply marked time, yet were willing to pick up any cheap offers. These were scarce, however, as Singapore and London were firm and not eager to sell. It is believed that a further decrease will be seen in London stocks next Monday, February 25, and as most of the stocks now held in London are against sales, further strong market is anticipated. Spot ribs closed at 25⅝ cents, with crepe at 27 cents.

January Imports

Importations of all grades in January were 52,305 tons, compared with 46,243 tons one year ago. Plantation arrivals for January were 51,202 tons, compared with 43,668 tons one year ago.

Rubber Afloat to the United States

All figures in long tons.

Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	Total
Feb. 2..	9,216	1,784	2,612	23	13,635
Feb. 9..	8,341	1,066	1,773	65	11,245
Feb. 16..	3,771	1,648	1,982	174	7,575
Feb. 23..	9,610	559	1,556	55	11,780

A special cable from the London Bureau of the *Journal of Commerce* states that a report issued February 18 revealed a decline of 656 tons in the rubber stock since last week, the total being returned at 24,757 tons.

New York Quotations

Following are the New York open market rubber quotations for one year ago, one month ago and February 23, the current date

Plantation Hevea	February 24, 1928	January 26, 1929	February 23, 1929
Rubber latex (Hevea).gal.	$1.50 @	$1.40 @	$1.40 @
CREPE			
First latex spot	.28½ @	.22½ @	.26¼ @
February-March	.28½ @	.22½ @	.26¼ @
April-June	.28¾ @	.22¾ @	.26½ @
July-Sept.	.29 @	.23 @	.27 @
Off latex, spot	.28 @	.22 @	.26 @
"B" Blanket, spot	.25½ @	.20½ @	.24 @
February-March	.25½ @	.20½ @	.24 @
April-June	.25¾ @	.21 @	.23½ @
July-Sept	.26 @	.21½ @	.24½ @
"C" Blanket, spot	.25 @	.20⅜ @	.23½ @
Brown No. 1	.25 @	.20¼ @	.23½ @
Brown No. 2	.24½ @	.20 @	.23¼ @
Brown, roll	.23¾ @	.16½ @	.19 @
Sheet			
Ribbed, smoked spot	.28¼ @	.22 @	.25⅛ @
February-March	.28¼ @	.22¼ @	.25½ @
April-June	.28½ @	.23 @	.25⅞ @
July-Sept.	.28¾ @	.23¼ @	.26⅜ @
East Indian			
PONTIANAK			
Banjermasin	.10 @.10¼	.10 @.12	.10½ @
Pressed block	.14⅞ @.15	.18 @.19	.16½ @
Sarawak	.10 @	@	@
South American			
PARAS			
Upriver, fine	.24 @	.23½ @	.26 @
Upriver, fine	*.28½ @	*.29 @	*.31½ @
Upriver, coadse	.23 @	.15 @	.15½ @
Upriver, coarse	*.20½ @	*.22 @	*.22½ @
Islands, fine	@	@	.22½ @
Islands, fine	*.34 @	*.28½ @	*.31 @
Acre, Bolivian, fine	.25 @	.24½ @	.26¾ @
Acre, Bolivian, fine	*.34½ @	*.30 @	*.32 @
Beni, Bolivian	.26 @	.25 @	.27 @
Madeira, fine	25 @	.23½ @	.26 @

South American	February 24, 1928	January 26, 1929	February 23, 1929
PARAS—*Continued*			
Peruvian, fine	.24 @	.22½ @	.24 @
Tapajos, fine	.23½ @	.22½ @	.24 @
CAUCHO			
Upper caucho ball	.20½ @	.15 @	.15½ @
Upper caucho ball	*.30 @	*.22 @	*.22½ @
Lower caucho ball	.19½ @	.14 @	.15 @
Maniçobas			
Ceará negro heads	†.18 @	†.18 @	†.20 @
Ceará scrap	†.10 @	†.10 @	†.12 @
Manicoba,30% guaranteed	†.20 @	†.20 @	†.22 @
Mangabiera, thin sheet	†.20 @	†.20 @	†.22 @
Centrals			
Central scrap	.18 @.18½	.13½ @.15	.14½ @
Central wet sheet	@	@	@
Corintò scrap	.18 @.18½	@	.14½ @
Esmeralda sausage	.18 @.18½	.13½ @.15	.14½ @
Guayule			
Duro, washed and dried.	†.28½ @	.17½ @	.21½ @
Ampar	@	.18½ @	.23 @
Gutta Percha			
Gutta Siak	.20 @.20¼	.20 @.22	.20 @
Gutta Soh	.36 @	.30 @.32	.32 @
Red Macassar	2.80 @ 3.00	2.90 @	2.75 @
Balata			
Block, Ciudad Bolivar	.44 @.45	.50 @.51	.50 @
Colombia	.41 @.42	.46 @.47	.47 @
Manaos block	.45 @.46	.55 @.56	.57 @
Panama	.41 @	.46 @.47	.54 @
Surinam sheet	.54 @	.49 @.50	@
Amber	.57 @	.53 @.54	.54 @
Chicle			
Honduras	‡.65 @	‡.68 @	‡.68 @
Yutacan, fine	‡.65 @	‡.68 @	‡.68 @

* Washed and dried crepe. Shipment from Brazil.
† Nominal. ‡ Duty paid.

Low and High New York Spot Prices

	February 1929*	February 1928	February 1927
PLANTATIONS			
First latex crepe	$0.22⅜ @ $0.26½	$0.28½ @ $0.38¼	$0.37½ @ $0.40⅜
Smoked sheet, ribbed	.21¾ @ .25½	.28½ @ .38	.37¼ @ .40
PARAS			
Upriver, fine	23½ @ .26⅛	.24 @ .29	.27¾ @ .32
Upriver, coarse	.14 @ .16¾	.18¾ @ .24½	.20½ @ .25
Islands, fine	.21½ @ .25	...... @	.25 @ .28⅜

*Figured to February 23, 1929.

London Stocks, December, 1928

	Landed for Dec. Tons	Delivered for Dec. Tons	Stocked December 31: 1928 Tons	1927 Tons	1926 Tons
LONDON					
Plantation	9,366	7,336	19,700	63,635	48,741
Other grades	20	20	77	105	100
LIVERPOOL					
Plantation	†1,308	†733	†2,788	†2,468	†1,897
Total tons, London and Liverpool	10,694	8,089	22,565	66,208	50,738

†Official returns from the seven recognized public warehouses.

Reclaimed Rubber

DESPITE the fact that crude rubber averaged below 20 cents from the middle of April to the end of 1928, consumption of reclaim for the year reached the record weight of 173,434 tons. The advance of crude since the middle of January, the possibility of still higher levels in the near future and the current heavy production of rubber goods are factors that cause the reclaimers to regard as excellent the prospects for another record year in demand for their product.

The intrinsic value of the better grades become relatively greater as the price of crude increases, for the volume cost of reclaims is more stable relatively to crude because the fluctuations in scrap prices are relatively minor in their effect.

The quotations of high tensile, black and dark gray auto tires, Nos. 1 and 2 tube reclaim, red miscellaneous and mechanical blends advanced moderately in February according to grades due to a stiffening in the prices of scrap.

Production of reclaims is at full 24 hour capacity as has been the case for many months in the past. The heaviest output is naturally in high tensile, automobile and tube grades.

The standard grades of reclaim are listed and quoted as follows:

New York Quotations

February 23, 1929

High Tensile	Spec. Grav.	Price Per Pound
Super-reclaim, black	1.20	$0.13 @$0.13½
red	1.20	.13 @ .13½

Auto Tire	Spec. Grav.	Price Per Pound
Black	1.21	$0.08 @$0.08½
Black selected tires	1.18	.08½ @ .09
Dark gray	1.35	.10 @ .10½
Light gray	1.38	.12 @ .12½
White	1.40	.13 @ .13½
Shoe		
Unwashed	1.60	.07¼ @ .07½
Washed	1.50	.10 @ .10¾
Tube		
No. 1	1.00	.14 @ .14½
No. 2	1.10	.11 @ .11½
Miscellaneous		
Red	1.35	.12½ @ .13
Truck tire, heavy gravity	1.55	.07 @ .07¼
Truck tire, light gravity	1.40	.07½ @ .07¾
Mechanical blends	1.60	.07 @ .07½

Rubber Scrap

THE market for rubber scrap during the past month was and still continues to be excellent in tone with a strong steady demand from consumers. Prices are firm and advancing, influenced by the stronger positions of reclaim, crude and heavy production schedules of tires, mechanical goods, etc. Scrap collections are in good seasonal volume owing to the generally open winter east of the Mississippi. Prices of all grades are well sustained. The notable advances are found in tire and tube grades.

Boots and shoes are in steady moderate demand. The same is true of tennis shoes and soles. All have shown a moderate advance in price.

All grades of inner tubes are active and firm at higher price levels than a month ago.

Pneumatic tires, with and without beads, have made substantial advances and are up from 10 to 20 per cent over the quotations of one month ago. Motor truck solid tires are also quoted 20 per cent higher.

Inner tubes of all qualities have advanced from 6 to 8 per cent with consumption unusually large.

The scrap grades that remain unchanged at last month's quotation are hard rubber, air brake, regular soft hose, white druggists' sundries and general mechanicals.

CONSUMERS' BUYING PRICES

Carload Lots

February 23, 1929

Boots and Shoes		Prices
Boots and shoes, black	lb.	$0.01⅝ @$0.01¾
Untrimmed artics	lb.	.01 @ .01⅛
Tennis shoes and soles	lb.	.01 @
Hard Rubber		
No. 1 hard rubber	lb.	$0.08 @$0.08½
Mechanicals		
Mixed black scrap	lb.	.00½ @ .00⅝
Hose, air brake	ton	32.50 @35.00
regular soft	lb.	17.50 @20.00
No. 1 red	lb.	.02 @ .02¼
No. 2 red	lb.	.01 @ .01½
White druggists' sundries	lb.	.02 @ .02½
Mechanical	lb.	.01½ @ .01⅝
Tires		
Pneumatic Standard—		
Mixed auto tires with beads	ton	28.00 @30.00
Beadless	ton	35.00 @37.50
White auto tires with beads	ton	40.00 @42.00
Beadless	ton	50.00 @57.50
Mixed auto peeling	ton	40.00 @42.00
Solid—		
Mixed motor truck, clean	ton	24.00 @25.00
Inner Tubes		
No. 1, floating	lb.	.07¼ @ .07½
No. 2, compounded	lb.	.05 @ .05¼
Red	lb.	.05½ @ .05¾
Mixed tubes	lb.	.05 @ .05⅛

Rims Approved by Tire & Rim Association

Rim Size	January, 1929 Number	January, 1929 Per Cent	January, 1928 Number	January, 1928 Per Cent
Motorcycle				
24 x 3 CC	3,216	0.2	....	...
24 x 3 Std.	4,200	0.2	*4,072	0.2
26 x 3 CC	756	0.0	....	...
26 x 3 Std.	....	...	*428	0.0
28 x 3 CC	337	0.0	....	...
28 x 3 Std.	....	...	*452	0.0
Clincher				
30 x 3½	45,539	2.5	42,306	2.6
18" Balloons				
18 x 3½	....	...	8,785	0.5
18 x 4	83,694	4.6	116,707	6.4
18 x 3.25	20,077	1.1	....	...
18 x 4½	21,112	1.2	4,595	0.3
18 x 5	6,824	0.4	....	...
19" Balloons				
19 x 2.75	23,216	1.3	....	...
19 x 3½	149,585	8.2	81,346	4.5
19 x 4	298,345	16.3	175,035	9.7
19 x 3.25	26,519	1.4	....	...
19 x 4½	17,189	0.9	66,404	3.7
19 x 5	3,519	0.2	....	...
20" Balloons				
20 x 2.75	424,180	23.1	....	...
20 x 3½	21,530	1.1	46,655	2.6
20 x 4	213,110	11.6	261,867	14.5
20 x 4½	53,635	2.9	61,065	3.4
20 x 5	42,916	2.3	45,525	2.5
20 x 6	16,976	0.9	9,201	0.5
20 x 6.75 DC	538	0.0	....	...
21" Balloons				
21 x 2.75	....	...	502,937	27.4
21 x 3½	18,987	1.0	70,730	3.9
21 x 4	8,935	0.5	81,935	4.5
21 x 4½	5,852	0.3	59,344	3.3
21 x 5	....	...	985	0.1
High Pressure				
30 x 3½—23	6,188	0.4	3,524	0.2
32 x 4½—23	7,606	0.4	3,183	0.2
32 x 4 —24	1,228	0.1	3,238	0.2
33 x 4½—24	....	...	406	0.0
33 x 4 —25	....	...	683	0.0
20" Truck				
30 x 5	254,682	13.9	128,020	7.1
32 x 6	28,814	1.6	15,429	0.9
34 x 7	10,409	0.6	6,663	0.4
36 x 8	5,142	0.3	3,044	0.2
40 x 10	....	...	470	0.0
22" Truck				
36 x 7	....	...	282	0.0
38 x 8	6	...	....	...
24" Truck				
34 x 5	2	0.0	2,730	0.1
36 x 6	4,552	0.2	2,052	0.1
38 x 7	2,541	0.1	553	0.0
40 x 8	1,496	0.1	716	0.0
44 x 10	....	...	167	0.0
Airplane				
8 x 3 SS	15	0.0	....	...
12 x 3 SS	24	0.0	....	...
16 x 3½ SS	919	0.0	....	...
20 x 4 SS	6	0.0	....	...
20 x 5 SS	2	0.0	....	...
20 x 6 SS	217	0.0	....	...
20 x 8 SS	215	0.0	....	...
18 x 4 CL	356	0.0	....	...
Totals	1,835,207	...	1,811,534	...

*Motorcycle rims not divided as between CC and 3" Standard, in 1928.

Compounding Ingredients

RUBBER manufacturing plants in all lines except clothing and footwear are very busy. Tire and tube output is scheduled to 24-hour capacity. In mechanicals, heels, insulation and sundries, production is well up to single shift capacity. The falling off in clothing and footwear is attributable entirely to the mild, open winter weather so far prevailing. This condition virtually nullifies demand. Footwear manufacturers are sampling their tennis and sports lines and will soon be busy on their production.

ACCELERATORS. The demand is notable in all well-known types of accelerators. The tendency is to favor those effective at moderately low temperatures that offer the greatest safety in mixing.

ANTI-LIGHT CRACKING MATERIALS. Under this classification a new ingredient has become available to the rubber compounders. The first of the kind to be offered is Sunproof, an effective non-toxic organic material of much interest to the rubber trade.

ANTIOXIDANTS. Compounders are now differentiating between antioxidants, using each with respect to its special adaptation for the type of goods being manufactured.

BENZOL. Benzol is in record production and good demand at firm prices.

CARBON BLACK. Prices are firm and unchanged with good seasonal consuming demand.

CLAY. Reinforcing clay has become staple in the principal lines of rubber goods in which abasive wear is important and is consequently in heavy volume demand on all sides.

DEGRAS. There is a steady quiet demand at prices unchanged.

LITHARGE. Previous to the middle of the month the price advanced to 9¼ cents a pound. There is a steady routine demand.

LITHOPONE. There is a fair seasonal movement at unchanged prices.

MINERAL RUBBER. Well established as an indispensable rubber compounding, the price for MR is firm and demand growing in volume.

SOLVENT NAPHTHA. Stocks are reported sold ahead at firm prices.

V. M. P. NAPHTHA. The price was reduced two cents a gallon in New York, and one cent a gallon in New England early in February. Demand is active.

STEARIC ACID. Prices firm. Consuming demand good.

ZINC OXIDE. Good contract movement is reported but not up to usual seasonal consumption.

New York Quotations

February 23, 1929

Accelerators, Inorganic

Lead, carbonate	lb.	$0.08½ @	
Lead, red	lb.	.10¼ @	
sublimed white	lb.	.08 @	
sublimed blue	lb.	.08 @	
super-sublimed white lead	lb.	.08¼ @	
Lime, R. M. hydrated	ton	20.00 @	
Litharge	lb.	.09¼ @	
Magnesia, calcined heavy	ton	85.00 @	
Magnesia carbonate	lb.	.06 @	.07
Orange mineral A.A.A.	lb.	.12¼ @	

Accelerators, Organic

A-7	lb.	.55 @	.65
A-11	lb.	.62 @	.75
A-16	lb.	.57 @	.65
A-19	lb.	.58 @	.75
A-20	lb.	.64 @	.80
A-32	lb.	.78 @	.95
Aero X	lb.	.60 @	.65
Aldehyde ammonia	lb.	.65 @	.70
B. B.	lb.	@	
Captax	lb.	@	
Crylene, hard form	lb.	@	
Paste	lb.	@	
Di-ortho-tolylguanidine	lb.	.42 @	.47
D. P. G.	lb.	.30 @	.35
Ethylidine aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.36 @	
Grasselerator 102	lb.	.62½ @	.63½
552	lb.	4.45 @	
808	lb.	.80 @	.85
833	lb.	1.17 @	1.35
Heptene	lb.	@	
Hexamethylene tetramine	lb.	.56 @	.62½
Lead oleate, No. 999	lb.	.16 @	
Witco	lb.	.14 @	
Methylene dianiline	lb.	.37 @	
Monex	lb.	@	
Piperidine pentamethylene dithio carbamate	lb.	4.45 @	4.60
Plastone	lb.	@	
R-2	lb.	2.00 @	2.50
R. & H. 40	lb.	.40 @	.42½
50	lb.	.40 @	.42½
Safex	lb.	@	
Super-sulphur, No. 1	lb.	@	
No. 2	lb.	@	
Tensilac No. 39	lb.	.50 @	.52½
No. 41	lb.	.50 @	.52½
Thermlo F	lb.	.50 @	.55
Thiocarbanilid	lb.	.25½ @	.26½
Trimene	lb.	@	
base	lb.	@	
Tuads	lb.	@	
ZBX	lb.	@	
Z-88	lb.	.50 @	.60
Zimate	lb.	@	

Acids

Acetic 28% (bbls.)	100 lbs.	3.88 @	4.13
glacial (carboys)	100 lbs.	14.18 @	14.43
Sulphuric, 66°	100 lbs.	1.60 @	

Alkalies

Caustic soda, 76% solid,	100 lbs.	2.95 @	

Anti-Oxidants

Age-Rite, powder	lb.	@	
resin	lb.	@	
white	lb.	@	

Anti-Oxidants—(Continued)

Antox	lb.	@	
Grasselerager A	lb.	$0.55 @	
Oxynone	lb.	.68 @	.90
Resistox	lb.	.54 @	.65
Stabilite	lb.	.64 @	
V. G. B.	lb.	@	

Colors

BLACK

Bone	lb.	.07 @	.08½
Carbon (see compounding ingredients)			
Drop	lb.	.05½ @	.15
Gastex	lb.	.05½ @	.07
Lampblack (commercial)	lb.	.09 @	

BLUE

Akco blue	lb.	1.80 @	
Huber Brilliant	lb.	4.20 @	4.70
Prussian	lb.	.31 @	.35
Ultramarine	lb.	.09 @	.20

BROWN

Huber Mocha	lb.	1.60 @	2.10
Sienna, Italian, raw	lb.	.05½ @	.12½

GREEN

Akco green	lb.	2.60 @	
Chrome, light	lb.	.27 @	.31
medium	lb.	.28 @	.31
Huber Brilliant	lb.	4.35 @	
Oxide of chromium	lb.	.34 @	

ORANGE

Huber Persian	lb.	.50 @	1.00

RED

Akco red	lb.	2.75 @	
Antimony			
Crimson, R. M. P. No. 3	lb.	.48 @	
Sulphur, free	lb.	.52 @	
7-A	lb.	.35 @	
Z-2	lb.	.22 @	
Vermilion, No. 5	lb.	@	
No. 15	lb.	@	
Golden, No. 40	lb.	@	
No. 60	lb.	@	
15/17%	lb.	@	
Aristi	lb.	@	
Huber Brilliant	lb.	1.35 @	1.85
Iron Oxides			
bright pure domestic	lb.	.12 @	
bright pure English	lb.	.14 @	
bright reduced English	lb.	.10 @	
bright reduced domestic	lb.	.10 @	
Indian (maroon), pure domestic	lb.	.11 @	
Indian (maroon), pure English	lb.	.10½ @	.11
Indian (maroon), reduced English	lb.	.09½ @	
Indian (maroon), reduced domestic	lb.	.08 @	
Oximony	lb.	.13¼ @	
Spanish red oxide	lb.	.03 @	.04¼
Sunburnt red	lb.	.14½ @	
Venetian reds	lb.	.02 @	.06
Vermilion, Eng. quicksilver	lb.	@	

Colors—(Continued)

WHITE

Azo (factory):			
ZZZ (lead free)	lb.	$0.06½ @	.07
ZZ (leaded)	lb.	.06¼ @	.06¾
Z (8% leaded)	lb.	.06¼ @	.06¾
Green seal	lb.	@	
Kadox	lb.	@	
Lithopone	lb.	.05¼ @	
Albalith	lb.	@	
Azolith	lb.	.05¼ @	.05¾
Grasselli	lb.	.05¼ @	.05¾
Sterling	lb.	@	
Vanolith	lb.	.05¾ @	
Red seal	lb.	@	
Special	lb.	@	
Titanox	lb.	.09½ @	.10
White seal	lb.	@	
XX green label	lb.	@	
XX red label	lb.	@	
Zinc Oxide			
AAA (lead free)	lb.	.07 @	

YELLOW

Akco yellow	lb.	1.45 @	
Cadmium sulphide	lb.	.75 @	1.00
Chrome	lb.	.16 @	.16¼
Grasselli cadmium	lb.	@	
Huber canary	lb.	3.30 @	3.80
Ochre, domestic	lb.	.01⅝ @	.02⅝
Oxide, pure	lb.	.08½ @	
Zinc, C. P., imported	lb.	.23 @	

Compounding Ingredients

Aluminum flake (sacks, c.l.)	ton	21.85 @	
(sacks l.c.l.)	ton	24.50 @	
Ammonium carb. pwd.	lb.	.11 @	
lump	lb.	.10 @	
Asbestine	ton	13.40 @	14.50
Barium, carbonate	ton	40.00 @	
Baryta white (f.o.b. St. Louis, bbls.)	ton	23.00 @	
Baryta white (f. o. b. St. Louis, (paper bags)	ton	22.20 @	
Barytes, imported	ton	27.00 @	34.00
pure white	ton	35.00 @	
off color	ton	27.50 @	
medium	ton	30.00 @	
Foam "A" (f. o. b. St. Louis, bbls.)	ton	23.00 @	
Foam "A" (f. o. b. St. Louis, bags)	ton	23.00 @	
Basofor	lb.	.04½ @	
Blanc fixe, dry	lb.	.04½ @	
pulp	ton	42.50 @	45.00
Carbon Black			
Aerfloted arrow	lb.	.08½ @	.12
Compressed	lb.	.08½ @	.12½
Fumonex	lb.	.06 @	.09
Micronex	lb.	.09 @	.13
Uncompressed	lb.	.08 @	.12
Carrara filler	ton	20.00 @	
Chalk	ton	12.00 @	
Clay, Blue Ridge, dark	ton	@	
Blue Ridge, light	ton	@	
China	lb.	.01¼ @	
Dixie	ton	@	
Langford	ton	@	
Mineral flour (Florida)	ton	@	
Perfection	ton	27.00 @	
Suprex	ton	10.00 @	22.00
Tensulite	ton	25.00 @	

Compounding Ingredients *(Continued)*

Cotton flock, black	lb.	$0.13 @	
light-colored	lb.	.10 @	.12
white	lb.	.12 @	.30
Glue, high grade	lb.	.25 @	.30
low grade	lb.	.22 @	.26
Infusorial earth	ton	35.00 @	
Mica, amber (fact'y)	ton	90.00 @	
Neomerpin, S. A. conc.	lb.	.60 @	
Pumice stone, powd.	lb.	.02½ @	.04
Rotten stone (bbls.)	lb.	.02½ @	.04½
Shellac, fine orange	lb.	.70 @	
Soap bark	lb.	.14½ @	.15
Soapstone	ton	15.00 @	22.00
Talc, domestic	ton	25.00 @	
French	ton	18.00 @	22.00
Pyrax A	ton	@	
B	ton	@	
Thermatomic carbon	lb.	@	
Velvetex	lb.	.04½ @	.06
Whiting			
Domestic	100 lbs.	1.00 @	
English, cliffstone	100 lbs.	1.50 @	
Quaker	ton	@	
Slate flour, gray (fact'y)	ton	6.00 @	
Snow white	ton	@	
Sussex	ton	@	
Vancolloid	ton	27.00 @	
Vansulite	ton	26.00 @	
Westminster Brand	100 lbs.	@	
Witco (l. c. l.) (f. o. b. New York)	ton	20.00 @	
Whiting, imp. chalk	100 lbs.	1.00 @	1.50
Paris White, Eng. Cliff	100 lbs.	1.50 @	2.50

Factice—See Rubber Substitutes

Mineral Rubber

Fluxrite (solid)	lb.	.05 @	.06
Genasco (fact'y)	ton	50.00 @	52.00
Gilsonite (fact'y)	ton	37.14 @	39.65
Granulated M. R.	ton	@	
Hydrocarbon, hard	ton	@	
Hydrocarbon, soft	ton	@	
Ohmlac Kapak, M. R.	ton	40.00 @	90.00
M-4	ton	175.00 @	
Paradura (fact'y)	ton	62.50 @	65.00
Pioneer, M. R., solid (fact'y)	ton	40.00 @	42.00
M. R. granulated	ton	50.00 @	52.00
Robertson, M. R., solid (fact'y)	ton	34.00 @	80.00
M. R. gran. (fact'y)	ton	38.00 @	80.00
Vansul Puro	ton	27.00 @	

New York Quotations

February 23, 1929

Oils

Mineral	gal.	$0.20 @	
Kerosene	gal.	.15 @	
Rapeseed	gal.	.86 @	
Red oil, distilled	lb.	.10⅝ @	.11⅛
Rubber process	gal.	.25 @	
Spindle	gal.	.30 @	

Rubber Substitutes or Factice

Black	lb.	.08 @	.14
Brown	lb.	.08 @	.15
White	lb.	.09 @	.16

Softeners

Burgundy pitch	100 lbs.	5.50 @	6.00
Atlas	100 lbs.	6.50 @	
Corn oil	lb.	.10½ @	
Cottonseed oil	lb.	.11¼ @	
Cycline oil	gal.	.28 @	.35
Degras	lb.	.03½ @	.04½
Fluxrite (fluid)	lb.	.05 @	.06
Moldrite	lb.	.07 @	.07½
Palm oil (Lagos)	lb.	.09¼ @	
Palm oil (Niger)	lb.	.08¾ @	
Palm oil (Witco)	lb.	.11 @	
Para-flux	gal.	.17 @	
Petrolatum, snow white	lb.	.08½ @	.08¾
Pigmentar	lb.	.038 @	.0446
Pine oil, steam distilled	gal.	.61 @	.63
Rosin K	bbl.	9.90 @	
Rosin oil, compounded	gal.	.36 @	
No. 3	gal.	.60 @	
No. 556	gal.	.51 @	
Rubite	lb.	.10½ @	
Rubtack	lb.	.08½ @	
Stearex	lb.	.16 @	.20
Stearic acid, double pressed	lb.	.18 @	.18½
Tackol	lb.	.09 @	.15
Tar (retort)	bbl.	12.50 @	13.00
Tasco W-S No. 1	lb.	.06 @	
A	lb.	.05 @	
Vansulol	lb.	.12½ @	
Vantar (Pine Tar)	gal.	.36 @	
Waxene	lb.	.30 @	.40
Woburn oil	lb.	.05½ @	.06

Solvents

Benzol (90%, 7.21 lbs. gal.)	gal.	$0.28 @	
Carbon bisulphide (99.9%, 10.81 lbs. gal.) (drums)	lb.	.05½ @	.08
tetrachloride (99.7%, 13.28 lbs. (gal.) (drums)	lb.	.06¼ @	.10
Cyclohexanone	lb.	.65 @	
Dip-Sol	gal.	.12½ @	
Dryolene	gal.	.11 @	
Gasoline			
No. 303			
Tankcars	gal.	.15 @	
Drums, c. l.	gal.	.31 @	
Drums, l. c. l.	gal.	.36 @	
Hexalin	lb.	.60 @	
acetate	lb.	.65 @	
Rub-Sol	gal.	.10 @	
Solvent naphtha	gal.	.35 @	
Stod-Sol	gal.	.10 @	
Sweet rubber cement naphtha	gal.	.16½ @	
Turpentine, Venice	lb.	.20 @	
steam distilled	gal.	.54 @	.56

Vulcanizing Ingredients

Sulphur			
Velvet flour (240 lb. bbls.)	100 lbs.	2.95 @	3.50
(150 lb. bags)	100 lbs.	2.60 @	3.15
Soft rubber (c.l.)	100 lbs.	2.40 @	2.75
(l.c.l.)	100 lbs.	@	
Superfine commercial flour (210 lb. bbls.)	100 lbs.	2.55 @	3.10
(100 lb. bags)	100 lbs.	2.40 @	2.80
Tire brand, superfine,	100 lbs.	1.90 @	2.25
Tube brand, velvet	100 lbs.	2.40 @	2.75
Sulphur chloride	lb.	.05 @	.07
Vandex (selenium)	lb.	@	
(See also Colors—Antimony)			

Waxes

Beeswax, white, com.	lb.	.55 @	
carnauba	lb.	.33 @	
ceresine, white	lb.	.12½ @	
montan	lb.	.07½ @	
ozokerite, black	lb.	.28 @	
green	lb.	@	
Paraffin			
122/124 white crude scale	lb.	.05 @	
124/126 white crude scale	lb.	.05 @	
120/122 fully refined	lb.	@	
125/127 fully refined	lb.	@	

Exports of Rubber, Caucho and Balata from Brazil During 1928

Quantities in Kilogrammes. 1 Kilo = 2:20 Pounds

	Europe						America						Grand
Exporters	Fine	Medium	Coarse	Caucho	Balata	Total	Fine	Medium	Coarse	Caucho	Balata	Total	Total
Berringer & Co.	1,623,127	176,369	237,716	730,626	400,755	3,168,593	1,325,079	100,012	157,429	768,436	72,709	2,423,665	5,592,258
General Rubber Co. of Brazil	1,244,372	249,410	183,482	511,657	34,225	2,223,146	2,066,043	192,719	476,934	466,219	41,686	3,243,601	5,466,747
J. G. Araujo & Co., Ltd.	633,347	70,652	81,148	94,949	156,814	1,036,910	1,292,525	29,604	138,203	170,020	73,549	1,703,901	2,740,811
Ranniger & Co.	704,160	40,289	59,559	59,924	146,600	1,010,532	477,101	7,510	151,193	33,574	781	670,159	1,680,691
S. Bitar, Irmãos	216,202	12,121	41,799	63,658	....	333,780	425,539	20,428	382,571	430,271	29,142	1,287,951	1,621,731
Cia. Paraense de Plantações de Borracha	250,772	....	....	12,390	....	263,162	508,069	6,420	199,764	470,992	109,164	1,294,409	1,557,571
Suarez, Filho & Co.	356,413	1,077	644	4,169	....	362,303	1,017,176	1,453	97,039	70,482	......	1,186,150	1,548,453
Companhia Fluvial	241,209	7,274	26,841	21,350	....	296,674	258,902	14,122	25,741	32,840	......	331,605	628,279
Suter, Baumann & Co.	281,817	35,348	57,279	109,823	15,288	499,555	102,900	6,770	14,360	....	2,100	126,130	625,685
Semper & Co.	135,030	14,205	9,340	21,592	3,294	183,461	119,508	2,400	4,380	....	5,525	131,813	315,274
Ferreira Costa & Co.	137,740	210	793	3,872	....	142,615	113,835	6,800	7,960	....	......	128,595	271,210
Amazon River St. Nav. Company (1911) Ltd.	104,420	2,156	9,291	12,180	....	128,047	....	....	....	....	......	....	128,047
B. Levy & Co.	47,964	338	15,759	640	1,020	65,721	4,800	....	10,098	....	2,720	17,618	83,339
Adelbert H. Alden, Ltd.	32,506	4,851	1,911	....	33,071	72,339	....	....	....	....	......	....	72,339
Jos. Origet & Co.	....	....	....	56,500	....	56,500	....	....	....	....	......	....	56,500
Teixeira & Co.	....	....	....	....	....	....	1,848	....	....	25,280	......	27,128	27,128
Pires Guerreiro & Co.	....	....	....	....	....	....	17,865	680	418	....	......	18,963	18,963
M. E. Serfaty	3,680	302	139	218	5,502	9,841	....	....	....	....	......	....	9,841
Ribeiro & Co.	....	....	....	....	....	....	6,240	....	....	....	......	6,240	6,240
Benchimol & Irmão	....	....	....	....	....	....	4,590	....	....	....	......	4,590	4,590
J. Adonias & Co.	....	....	....	....	....	....	2,470	....	....	....	......	2,470	2,470
Sundry	....	....	....	....	....	....	3,846	....	500	....	......	4,346	4,346
Total from Pará and Manáos	6,012,759	614,602	725,701	1,703,548	796,569	9,853,179	7,748,336	388,918	1,666,590	2,468,114	337,376	12,609,334	22,462,513
Total from Iquitos	67,683	24,587	15,427	16,009	348,212	471,918	88,042	116,795	49,357	40,324	412,906	707,424	1,179,342
Grand total from the Amazons	6,080,442	639,189	741,128	1,719,557	1,144,781	10,325,097	7,836,378	505,713	1,715,947	2,508,438	750,282	13,316,758	23,641,855

Destinations

	From Para	From Manáos	From Iquitos	Total
United States	4,456,583	7,330,263	707,424	12,494,270
Germany	817,092	3,866,961	148,588	4,832,641
England	730,875	2,023,823	67,828	2,822,526
France	901,718	1,099,732	253,387	2,254,837
Brazil (South)	686,618	135,870	....	822,488
Netherlands	168,349	40,230	....	208,579
Belgium	51,061	127,010	2,115	180,186
Spain	10,808	10,080	....	20,888
Italy	....	5,440	....	5,440
Totals	7,823,104	14,639,409	1,179,342	23,641,855

Compiled by Berringer & Co., Para, Brazil.

Cotton and Fabrics

AMERICAN COTTON. The price of spot middling cotton on February 1 was 20.00 cents compared with 20.10 cents on January 2. On February 4, 5 and 6 spot ranged from 19.85 cents to 19.95 cents. With these exceptions the price ruled 20 cents or better from the February 7 to February 22, which was a holiday. The spot price of middling from the sixteenth to closing of the market on February 21 was 20.25 cents.

An important factor yet to be developed, is the bearing of new crop prospects indicated by spring planting operations, etc. The outlook for higher cotton prices is considered less favorable but stability is probable.

AMERICAN STAPLES. The demand for staple cottons centers on high grades in medium lengths with the market quiet. Eastern and southern mills are seeking supplies of middling 1⅛-inch staples.

EGYPTIAN COTTON. Demand has been dull in all markets for all varieties of extra staple and premium cottons. Business in grades lower than middling has been more active for some weeks than for higher grades, with prices for the former in the buyer's favor. Quotations on Egyptian cotton c. i. f. Boston for March-April shipments were as followers: Medium Sakelarides, 35.40 cents; Medium Uppers, 25.35 cents.

Cotton Fabrics

DUCKS, DRILLS AND OSNABURGS. The market is regaining momentum gradually following the depression due to the Christmas holidays and the first of the year inventory periods. Production machinery is under partial engagement covering the first six months of this year. The trade is looking for a strong fabric market for the second quarter of the year.

As compared with prices one month ago the narrower drills are slightly lower while the 52 and 59 inch are somewhat higher. In ducks prices are higher, especially is this the case with 40 inch, 1.45 S. F. grade which has advanced to 25⅛ cents per yard or 2⅓ cents over the quotation February 1.

In Osnaburgs prices are the same or very slightly higher except in the case of 40 inch, 3.00 yard goods which are ⅜ cent lower.

RAINCOAT FABRICS. Practically the same conditions prevail this month as last. The raincoat business is very quiet due to the generally fine weather conditions that have prevailed thus far this winter. Active business in raincoat fabrics are not expected for at least another 30 days. Prices on all widths and qualities are fractionally lower than a month ago.

SHEETINGS. Sheetings have lagged behind in the textile market thus far this year and are generally quiet. The failure of demand to reach the usual active proportions has been somewhat disappointing. In consequence the present quotations are lower on all numbers than they were one month ago. The decline is fractional in all cases running as a rule ⅛ cent lower.

TIRE FABRICS. The expanding automobile industry will consume this season a larger poundage of tire fabrics than in any previous season. Early in February orders were for American and Egyptian qualities only. While the demand was not heavy some fabric manufacturers are kept sold ahead by the succession of small orders.

During the second week of February the demand was seasonally normal. There were fair size inquiries but no general buying movement, a moderate demand developed and prices held firm. The second holiday in the short month occurred on the twenty-second. In the four days preceding inquiry broadened but sales remained light and seasonal with prices firm and unchanged in expectation of a more active demand shortly to develop.

New York Quotations

February 23, 1929

Drills

38-inch 2.00-yard ......*yard*	$0.17½@
40-inch 3.47-yard	.10⅜@
50-inch 1.52-yard	.24⅜@
52-inch 1.90-yard	.20 @
52-inch 2.20-yard	.17½@
59-inch 1.85-yard	.20⅞@

Ducks

38-inch 2.00-yard S. F..*yard*	.18½@
40-inch 1.45-yard S. F.....	.25⅛@
72-inch 1.05-yard D. F.....	.37⅛@
72-inch 16.66-ounce	.40⅝@
72-inch 17.21-ounce	.41⅞@

MECHANICAL

Hose and belting.....*pound*	.37½@
Specials	.40½@

TENNIS

52-inch 1.35-yard ......*yard*	.27½@

Hollands

R.T.5—30-inch ....*yard*	.16 @
R.T.7—36-inch	.18 @
R.T.8—40-inch	.20 @

RED SEAL

36-inch	.15½@
40-inch	.16½@
50-inch	.25 @

GOLD SEAL

40-inch, No. 72............	.20¾@
40-inch, No. 80............	.22 @

Osnabur gs

40-inch 2.35-yard ......*yard*	$0.15⅜@
40-inch 2.48-yard	.14½@
40-inch 3.00-yard	.11⅝@
40-inch 10-oz. part waste..*lb.*	.19⅜@
37-inch 2.42-yard	.14⅞@

Raincoat Fabrics

COTTON

Bombazine 64 x 60....*yard*	.10½@
Bombazine 60 x 48.........	.09½@
Plaids 60 x 48.............	.12 @
Plaids 48 x 48.............	.11 @
Surface prints 64 x 60.....	.13½@
Surface prints 60 x 48.....	.12½@
Print cloth, 38½-in., 60 x 48	.06¾@
Print cloth, 38½, 64 x 60...	.07½@

Sheetings, 40-inch

48 x 48, 2.50-yard.....*yard*	.12⅝@	.12¾
48 x 48, 2.85-yard.........	.11⅛@	.11¼
64 x 68, 3.15-yard.........	.11¾@	
56 x 60, 3.60-yard.........	.09½@	.09⅝
44 x 48, 3.75-yard.........	.08⅜@	

Sheetings, 36-inch

48 x 48, 5.00-yard.....*yard*	.06¾@
40 x 44, 6.15-yard.........	.05⅝@

Tire Fabrics

SQUARE WOVEN 17¼-ounce

Peeler, karded ......*pound*	$0.46½@

BUILDER 23/11

Peeler, karded ......*pound*	.46½@

BUILDER 10/5

Peeler, karded ......*pound*	.43½@

CORD 23/5/3

Peeler, karded, 1$\frac{1}{16}$-in..*pound*	.46½@

CORD 23/4/3

Peeler, karded ......*pound*	.47½@

CORD 23/3/3

Peeler, karded ......*pound*	.48½@

CORD 15/3/3

Peeler, karded ......*pound*	.44½@

CORD 13/3/3

Peeler, karded ......*pound*	.43½@

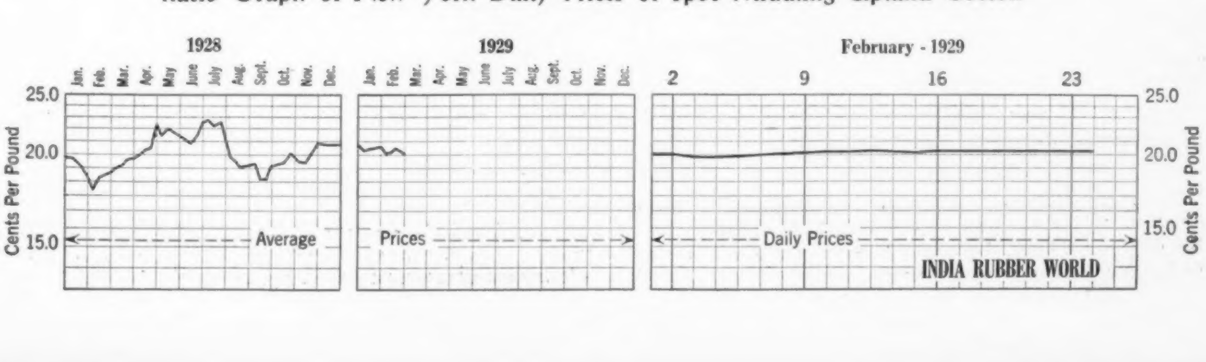
LENO BREAKER

8-oz. Peeler, karded...*pound*	.46½@
10-oz. Peeler, karded.......	.46½@

CHAFER

9.5-oz. Peeler, karded..*pound*	@
12-oz. Peeler, karded.......	@
14-oz. Peeler, karded.......	.46½@

Ratio Graph of New York Daily Prices of Spot Middling Upland Cotton



United States Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	November, 1928		Eleven Months Ended November, 1928	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	82,037,326	$14,934,387	880,617,147	$227,269,715
Balata	132,102	41,119	1,452,131	372,544
Jelutong or Pontianak	1,056,782	140,116	15,748,154	2,383,905
Guta percha	197,720	35,409	3,253,783	717,212
Guayule	....	....	6,891,719	1,755,685
Scrap and reclaimed	2,198,821	62,445	19,115,091	622,492
Totals	85,622,751	$15,213,476	927,078,025	$233,121,553
Chicle ....*dutiable*	1,129,251	$531,626	11,264,534	$5,701,544
MANUFACTURED—*Dutiable*				
Rubber belting	42,129	$23,126	484,496	$273,083
Rubber tires	235	1,516	4,427	69,438
Other manufactures of rubber	....	151,014	....	1,498,647
Totals	42,364	$175,656	488,923	$1,841,168

EXPORTS OF FOREIGN MERCHANDISE

	Pounds	Value	Pounds	Value
RUBBER MANUFACTURES				
Crude rubber	6,223,739	$1,202,930	65,902,047	$16,962,618
Balata	30,432	6,451	283,315	102,573
Gutta percha, rubber substitutes and scrap	25	20	140,982	17,936
Rubber manufactures	....	10,319	....	335,652
Totals	6,254,196	$1,219,720	66,326,344	$17,418,779

EXPORTS OF DOMESTIC MERCHANDISE

	Pounds	Value	Pounds	Value
MANUFACTURED				
Reclaimed	1,635,381	$118,853	19,944,468	$1,535,514
Scrap and old	3,470,971	152,946	40,244,127	2,072,639
Rubberized piece goods and hospital sheeting..*sq. yd.*	127,599	59,253	1,630,296	791,859
Footwear				
Boots ....*pairs*	141,961	285,969	1,136,559	2,571,219
Shoes ....*pairs*	220,561	263,296	2,405,117	2,635,041
Canvas shoes with rubber soles ....*pairs*	417,874	268,956	4,843,385	3,337,943
Rubber water bottles and fountain syringes..*number*	43,037	24,866	338,870	213,370
Rubber gloves.....*doz. pairs*	7,328	21,364	86,697	251,287
Other druggists' rubber sundries	....	33,685	....	386,483
Rubber balloons.......*gross*	67,337	80,613	543,323	664,476
Rubber toys and balls	....	24,061	....	190,399
Bathing caps.......*doz.*	2,759	6,452	159,462	368,293
Hard rubber goods				
Electrical hard rubber goods	183,271	32,791	1,472,220	292,271
Other hard rubber goods..	....	41,817	....	323,379
Tires				
Casings, automobile.*number*	251,792	3,095,586	2,258,935	28,260,361
Tubes, automobile..*number*	160,283	334,735	1,500,263	3,207,179
Other casings and tubes *number*	8,453	11,684	55,254	116,412
Solid tires for automobiles and motor trucks.*number*	3,985	110,922	52,730	1,684,802
Others	97,915	19,352	1,664,297	369,240
Tire accessories	....	133,980	....	1,508,660
Rubber and friction tape...	115,089	40,851	1,429,605	436,799
Belting	439,298	242,826	4,499,448	2,568,269
Hose	660,631	230,745	6,810,891	2,454,962
Packing	203,368	103,888	2,409,709	1,109,576
Soles and heels	179,795	169,798	1,325,854	1,752,445
Thread	119,690	129,705	1,445,582	1,586,921
Rubber bands and erasers ..	84,418	52,424	835,200	553,929
Other rubber manufactures..	....	252,455	....	2,385,483
Totals	....	$6,343,873	....	$63,629,211

Crude Rubber Imports by Customs Districts

	*December, 1928		Twelve Months Ended *December, 1928	
	Pounds	Value	Pounds	Value
Massachusetts	2,425,669	$464,627	35,826,073	$9,519,744
Buffalo	....	....	12,060	2,290
New York	84,569,068	15,304,248	770,610,232	195,351,081
Philadelphia	1,578,726	266,420	23,686,670	7,691,531
Maryland	727,663	123,201	23,472,329	6,979,470
Los Angeles	4,908,092	847,423	33,276,489	8,085,187
San Francisco	203,684	52,328	1,296,242	342,981
Oregon	....	....	116,735	35,568
Michigan	....	....	33,600	10,080
Ohio	2,870,224	488,711	5,796,618	1,419,557
St. Louis	....	....	280,000	110,749
Wisconsin	....	....	56,000	21,982
Colorado	200,400	36,980	1,082,720	234,882
Totals	97,483,526	$17,583,938	895,545,768	$229,805,102

* Including latex, dry rubber content.

THE UNITED KINGDOM AS USUAL WAS THE PRINCIPAL OUTLET for U. S. rubber and friction tape, taking 51,027 pounds, valued at $13,492 in December 1928. Argentina was a poor second market, with 21,170 pounds, valued at $8,942.

United Kingdom Statistics

IMPORTS

UNMANUFACTURED	December, 1928		Twelve Months Ended December, 1928	
	Pounds	Value	Pounds	Value
Crude Rubber				
From—				
Straits Settlements	16,701,600	£551,787	95,053,200	£4,281,994
Federated Malay States...	8,240,300	294,613	46,019,300	2,094,160
British India	735,700	26,456	12,370,200	633,766
Ceylon and Dependencies..	4,640,700	167,103	30,684,500	1,443,951
Other Dutch possessions in Indian Seas	1,604,700	57,575	22,336,700	1,102,973
Dutch East Indies (except Other Dutch possessions in Indian Seas)	1,670,900	59,639	25,572,100	1,240,526
Other countries in East Indies and Pacific not elsewhere specified	166,300	6,402	3,051,100	147,079
Brazil	711,800	27,584	5,191,900	239,988
South and Central America (except Brazil)	....	....	285,300	13,658
West Africa				
French West Africa....	10,100	400	116,100	4,758
Gold Coast	31,100	1,154	502,100	23,858
Other parts of West Africa	206,700	7,111	2,100,700	92,210
East Africa, including Madagascar	56,900	2,060	1,221,700	58,502
Other countries	144,100	5,032	1,579,000	73,356
Totals	34,920,900	£1,206,916	246,083,900	£11,450,779
Gutta percha and balata....	352,000	29,371	3,382,800	278,528
Waste and reclaimed rubber.	464,000	7,073	8,744,100	108,760
Rubber substitutes	3,600	78	47,300	1,293
Totals	35,740,500	£1,243,438	258,258,100	£11,839,360
MANUFACTURED				
*†‡Tires and tubes				
Pneumatic				
Outer covers	....	£35,007	....	£737,189
Inner tubes	....	7,782	....	143,917
Solid tires	....	9,235	....	91,241
Boots and shoes....*doz. pairs*	41,877	98,004	770,025	1,626,123
Other rubber manufactures..	....	109,271	....	1,723,245
Totals	....	£259,299	....	£4,321,715

EXPORTS

	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Waste and reclaimed rubber.	2,612,600	£22,465	32,258,500	£241,838
Rubber substitutes	66,200	1,370	583,600	13,775
Totals	2,678,800	£23,835	32,842,100	£255,613
MANUFACTURED				
‡Tires and tubes				
Pneumatic				
Outer covers	....	£196,887	....	£2,698,627
Inner tubes	....	40,446	....	501,975
Solid tires	....	14,859	....	226,178
Boots and shoes....*doz. pairs*	24,039	45,836	270,814	456,255
Other rubber manufactures..	....	217,605	....	2,988,713
Totals	....	£515,633	....	£6,871,748

EXPORTS—COLONIAL AND FOREIGN

	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude Rubber				
To—				
Russia	1,479,600	£73,580	8,904,000	£565,511
Sweden, Norway and Denmark	230,900	10,276	3,240,000	190,620
Germany	1,964,600	73,793	36,798,200	1,945,015
Belgium	1,006,400	40,666	9,902,200	521,002
France	3,487,200	109,084	38,931,000	1,863,813
Spain	366,300	16,852	2,139,500	130,637
Italy	1,607,500	60,447	16,677,700	819,673
Other European countries.	382,100	16,067	4,958,000	310,586
United States	5,332,200	209,809	111,896,700	6,183,566
Canada	....	....	127,200	5,217
Other countries	163,300	8,031	1,654,000	114,622
Totals	16,020,100	£618,605	235,228,500	£12,650,262
Gutta percha and balata.....	126,900	8,459	889,500	65,057
Waste and reclaimed rubber.	13,400	260	237,500	4,811
Rubber substitutes	11,000	400	16,600	667
Totals	16,171,400	£627,724	236,372,100	£12,720,797
MANUFACTURED				
*‡Tires and tubes				
Pneumatic				
Outer covers	....	£6,483	....	£150,262
Inner tubes	....	1,004	....	30,204
Solid tires	....	749	....	5,011
Boots and shoes....*doz. pairs*	992	2,575	13,292	26,900
Other rubber manufactures..	....	6,702	....	125,825
Totals	....	£17,513	....	£338,202

*After Apr. 12, 1927, tires and tubes imported or exported with complete vehicles or chassis, or fitted to wheels imported separately, are included under complete vehicles or parts.

†Motor cars, motorcycles, parts and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts and accessories were exempt from duty until Apr. 30, 1926, inclusive, and rubber tires and tubes until Apr. 11, 1927, inclusive.

‡Tires and tubes included prior to Apr. 12, 1927.

Imports, Consumption and Stocks

The accompanying graph covers crude rubber importations, consumption and stocks by months for the years 1927 to 1928, inclusive, and for January and February of 1929. The figures for February being estimates.

Imports during January 1929 was 3,695 tons under the estimate but at that was 6,106 tons above the imports for January 1928. February imports are estimated at 60,000 tons.

January consumption was estimated at 30,000 tons and proved to be 43,000 tons or 13,000 tons above the estimate and 9,000 tons more than that of January one year ago.

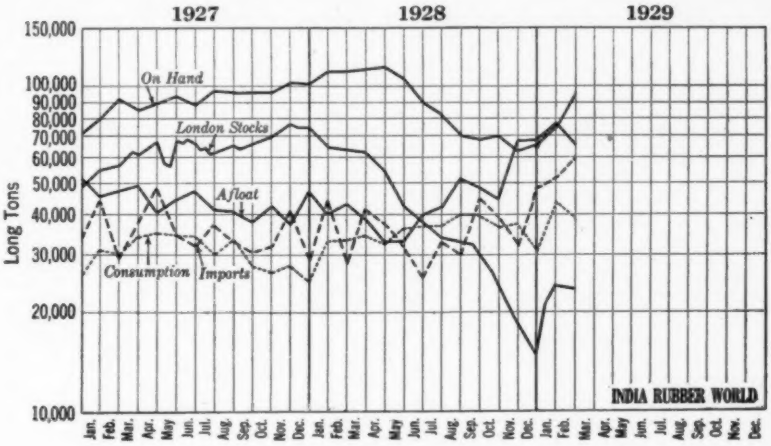
February estimated consumption is placed at 39,000 tons. Other estimates for February are, on hand, 95,000 tons and afloat, 65,000 tons.

London stocks declined moderately in February as per the following weekly record: February 2, 25,389 tons; February 9, 25,413 tons; February 16, 24,757 tons; February 23, 24,500 tons.

Twelve Months	Imports Tons	Consumption Tons	Stocks: On Hand Tons	Stocks: Afloat Tons	London Tons	Singapore and Penang Tons
1925	384,837	389,136	51,000*	48,000*	.....	.....
1926	411,900	366,140	72,510*	52,019*	.....	.....
1927	426,258	370,915	100,130*	47,939*	63,207*	25,868*
1928	448,378	441,336	66,166*	68,764*	24,423†	34,432*
1929						
January	52,305	43,000	76,342	78,596	.....	.....
Feb. (est.)	60,000	39,000	95,000	65,000	.....	.....

*December 31. †January 26.

The 1928 figures, unless otherwise specified, are all as of the first of each month.



U. S. Imports, Consumption and Stocks

United States Imports of Crude Rubber and Liquid Latex—By Countries

Calendar Year, 1928

	*Crude Rubber: Pounds	Tons	Value	†Liquid Latex: Pounds	Tons	Value
Belgium	1,089,100	486	$171,218	....	....	....
France	1,947,728	869	407,386	....	....	....
Germany	1,623,315	725	377,474	18,381	8	$3,271
Netherlands	1,812,507	809	419,171	....	....	....
Switzerland	800	.....	270	....	....	....
United Kingdom	107,956,519	48,195	28,868,070	348,523	156	61,888
Canada	231,131	103	47,793	....	....	....
Costa Rica	2,212	1	798	....	....	....
Nicaragua	35,935	16	7,403	....	....	....
Panama	21,459	10	3,740	....	....	....
Jamaica	4,522	2	1,809	....	....	....
Trinidad and Tobago	13,964	6	5,445	....	....	....
Bolivia	254,025	113	47,044	....	....	....
Brazil	25,270,174	11,281	5,126,974	110,230	49	20,996
Colombia	147,361	66	32,003	....	....	....
Ecuador	834,562	373	189,183	....	....	....
British Guiana	224,300	100	48,059	....	....	....
Surinam	83,944	38	20,174	....	....	....
Paraguay	33,444	15	5,762	....	....	....
Peru	651,486	291	128,268	....	....	....
Uruguay	142,010	63	36,361	....	....	....
Venezuela	212,949	95	59,791	....	....	....
British India	2,120,526	947	608,742	....	....	....
British Malaya	553,310,817	247,014	136,734,000	5,461,840	2,438	1,277,676
Ceylon	82,587,513	36,870	20,794,919	112,000	50	18,937
China	45,020	20	11,732	....	....	....
Java and Madura	99,758,497	44,535	25,418,644	367,624	164	76,788
Other N. E. I.	87,374,202	39,006	22,820,257	2,914,144	1,301	725,967
Persia	24,075	11	4,003	....	....	....
Philippine Is.	370,132	166	123,119	....	....	....
Australia	85,942	38	21,295	....	....	....
British Oceania	86,656	39	22,056	....	....	....
New Zealand	128,357	57	38,000	....	....	....
Union of S. A.	2,376	1	235	2,185	1	56
British W. A.	24,381	11	5,396	....	....	....
Liberia	249,253	111	61,349	....	....	....
Other P. A.	11,272	5	1,451	....	....	....
Totals	968,772,466	432,488	$242,669,394	9,334,927	4,167	$2,185,579

*Imports of guayule rubber from Mexico during the calendar year, 1928, totaled 6,891,719 pounds valued at $1,755,685. Total rubber imports amounted to 439,732 long tons.

†Pounds of dry rubber contained in latex imported; crude rubber content is taken as three pounds per gallon of latex.

The gross imports of crude rubber, liquid latex and guayule in the calendar year amounted to 439,732 long tons; by deducting calendar year reexports (32,159 long tons) the net imports were 407,573 long tons.

World Rubber Production—Net Exports

British Malaya:	Jan.-Dec. 1927	Jan.-Dec. 1928	Long Tons—1928-1929: Nov.	Dec.	Jan.
Gross exports	371,513	409,430	68,135	†66,763	52,546
Imports	182,843	149,787	10,436	11,112	13,415
Net	188,670	259,643	57,699	55,651	39,131
Ceylon	55,356	57,546	8,005	8,127	8,190
India and Burma	11,321	10,790	1,048	1,113	....
Sarawak	10,923	10,087	772	744	....
B. N. Borneo	6,602	6,505	*500	*500	....
Siam	5,472	4,813	425	294	....
Java and Madura	55,297	58,848	4,950	5,110	....
Sumatra East Coast	77,815	82,511	7,902	8,792	....
Other N. E. Indies	142,171	121,770	7,805	10,896	....
French Indo-China	8,645	9,601	943	948	395
Other America	2,454	1,490	96	78	....
Amazon Valley	28,782	21,129	1,790	2,220	2,134
Mexican Guayule	5,019	3,076	....	....	....
Africa	8,162	6,124	527	510	....
Totals	606,687	653,933	92,462	94,983	....

* Estimated.
† Excluding dry content of concentrated latex.
‡ Preliminary statistics.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Absorption—Net Imports

	Total Jan.-Sept. 1927	Total Jan.-Sept. 1928	Long Tons—1928: Oct.	Nov.	Dec.
Australia	6,504	6,072	766	337	755
Belgium	4,493	6,079	696	544	....
Canada	20,397	22,531	2,943	2,799	2,618
Czechoslovakia	1,692	2,338	318	282	....
Denmark	426	352	104	59	51
Finland	509	569	65	80	54
France	22,436	25,919	3,728	3,278	....
Germany	27,373	27,305	4,386	3,694	2,470
Italy	7,731	8,899	1,049	1,340	1,145
Japan	14,270	16,758	3,711	2,150	....
Netherlands	386	1,923	141	31	148
Norway	479	502	86	64	....
Russia	8,250	12,969	....	....	....
Spain	1,388	2,413	250	252	....
Sweden	1,422	1,696	272	134	254
United Kingdom	52,364	482	934	*3,141	8,438
United States	306,607	288,204	41,667	33,836	....
U. S. (Guayule)	3,696	3,076	....	....	....
Totals	480,423	428,087	....	....	....

* Excess of reexports over imports.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Chemical Engineering Courses

The University of Michigan has announced special chemical engineering courses for 1929. These include graduate courses in general chemical engineering, metallurgical engineering, gas engineering and organic chemical industries. Several industrial fellowships will be available for graduate students next year, applications for which should be made by April 1. Copies of the bulletin may be secured by writing the Chemical Engineering Department, University of Michigan, Ann Arbor, Mich.

Crude Rubber Arrivals at New York as Reported by Importers

Plantations

JAN. 16. By "Pyrrhus," Far East.

	Cases
General Rubber Co.	13,447
The Meyer & Brown Corp.	*200

JAN. 18. By "Steel Age," Far East.

	Cases
Baird Rubber & Trading Co., Inc.	73
General Rubber Co.	160
Littlejohn & Co., Inc.	153
Rogers Brown & Crocker Bros., Inc.	50
Chas. T. Wilson Co., Inc.	52

JAN. 19. By "Jalapa," Far East.

	Cases
Robert Badenhop Corp.	112
General Rubber Co.	280
The Meyer & Brown Corp.	210

JAN. 20. By "Harburg," Far East.

	Cases
Hood Rubber Co.	*1,040

JAN. 20. By "Volendam," Far East.

	Cases
General Rubber Co.	65

JAN. 21. By "Alaunia," Europe.

	Cases
General Rubber Co.	492
Littlejohn & Co., Inc.	397

JAN. 21. By "City of Newcastle," Far East.

	Cases
Bierrie & Co., Inc.	297
General Rubber Co.	110
Haldane & Co., Inc.	116
Hood Rubber Co.	*127
Lavino American & Asiatic Co.	186
Littlejohn & Co., Inc.	2,673
The Meyer & Brown Corp.	980
H. Muehlstein & Co., Inc.	560
Poel & Kelly, Inc.	56
Chas. T. Wilson Co., Inc.	450

JAN. 21. By "Minnewaska," Europe.

	Cases
General Rubber Co.	989
Littlejohn & Co., Inc.	366

JAN. 21. By "Silveray," Far East.

	Cases
General Rubber Co.	†1,675
Littlejohn & Co., Inc.	†200

JAN. 23. By "Bolton Castle," Far East.

	Cases
H. A. Astlett & Co.	1,867
Robert Badenhop Corp.	315
Baird Rubber & Trading Co., Inc.	356
Bierrie & Co., Inc.	550
General Rubber Co.	11,879
Haldane & Co., Inc.	1,050
Hood Rubber Co.	22
Lavino American & Asiatic Co.	2,135
Littlejohn & Co., Inc.	7,679
The Meyer & Brown Corp.	2,415
H. Muehlstein & Co., Inc.	450
Poel & Kelly, Inc.	590
Poel & Kelly, Inc.	*305
Raw Products Co.	250
Rogers Brown & Crocker Bros., Inc.	1,910
Rogers Brown & Crocker Bros., Inc.	*200
Chas. T. Wilson Co., Inc.	1,715

JAN. 23. By "Golden Dragon," Far East.

	Cases
The Meyer & Brown Corp.	†100

JAN. 23. By "Karimoen," Far East.

	Cases
H. A. Astlett & Co.	1,594
Robert Badenhop Corp. pkgs.	810
Baird Rubber & Trading Co., Inc.	164
Bierrie & Co., Inc.	301
General Rubber Co.	5,992
Haldane & Co., Inc.	305
Hood Rubber Co.	*449
Littlejohn & Co., Inc.	1,032
The Meyer & Brown Corp.	1,104
The Meyer & Brown Corp.	*272
H. Muehlstein & Co., Inc.	610
Poel & Kelly, Inc.	82
Rogers Brown & Crocker Bros., Inc.	273
Chas. T. Wilson Co., Inc.	556

JAN. 25. By "Mathura," Far East.

	Cases
H. A. Astlett & Co.	104
Bierrie & Co., Inc.	333
General Rubber Co.	1,260
Lavino American & Asiatic Co.	112
Littlejohn & Co., Inc.	199
The Meyer & Brown Corp.	1,320
H. Muehlstein & Co., Inc.	890
Rogers Brown & Crocker Bros., Inc.	148
Rogers Brown & Crocker Bros., Inc.	*329
Chas. T. Wilson Co., Inc.	825

*Arrived at Boston.
†Arrived at Los Angeles.

JAN. 27. By "Koranna," Far East.

	Cases
H. A. Astlett & Co.	300
Robert Badenhop Corp.	160
General Rubber Co.	280
Littlejohn & Co., Inc.	1,550
The Meyer & Brown Corp.	1,100
H. Muehlstein & Co., Inc.	620
Poel & Kelly, Inc.	70
Rogers Brown & Crocker Bros., Inc.	262
Chas. T. Wilson Co., Inc.	492

JAN. 27. By "Niew Amsterdam," Europe.

	Cases
Littlejohn & Co., Inc.	394

JAN. 27. By "Pres. Harrison," Far East.

	Cases
H. A. Astlett & Co.	1,535
Robert Badenhop Corp. pkgs.	891
Baird Rubber & Trading Co., Inc.	725
Baird Rubber & Trading Co., Inc.	*100
Bierrie & Co., Inc.	600
General Rubber Co.	5,043
Haldane & Co., Inc.	800
Hood Rubber Co.	*369
Lavino American & Asiatic Co.	110
Littlejohn & Co., Inc.	3,458
The Meyer & Brown Corp.	1,072
H. Muehlstein & Co., Inc.	1,590
Poel & Kelly, Inc.	20
Poel & Kelly, Inc.	*256
Rogers Brown & Crocker Bros., Inc.	1,020
Rogers Brown & Crocker Bros., Inc.	*55
Chas. T. Wilson Co., Inc.	317

JAN. 27. By "Pres. Jackson," Far East.

	Cases
H. A. Astlett & Co.	†561
Robert Badenhop Corp.	†500
Littlejohn & Co., Inc.	†2,339
The Meyer & Brown Corp.	†250

JAN. 28. By "Aurania," Europe.

	Cases
General Rubber Co.	320
Littlejohn & Co., Inc.	142

JAN. 29. By "Minnetonka," London.

	Cases
Robert Badenhop Corp.	250
Bierrie & Co., Inc.	135
General Rubber Co.	391
Littlejohn & Co., Inc.	538
The Meyer & Brown Corp.	250
Raw Products Co.	100

JAN. 31. By "Golden Dragon," Far East.

	Cases
Littlejohn & Co., Inc.	†150

FEB. 1. By "Golden Hind," Far East.

	Cases
The Meyer & Brown Corp.	†650

FEB. 2. By "Ausonia," Europe.

	Cases
General Rubber Co.	95
Littlejohn & Co., Inc.	200

FEB. 4. By "American Merchant," Far East.

	Cases
General Rubber Co.	180

FEB. 4. By "Silveroak," Far East.

	Cases
Littlejohn & Co., Inc.	†270
The Meyer & Brown Corp.	†850

FEB. 5. By "Ammon," Far East.

	Cases
Hood Rubber Co.	*640

FEB. 5. By "Dardanus," Far East.

	Cases
H. A. Astlett & Co.	1,543
Robert Badenhop Corp. pkgs.	980
Baird Rubber & Trading Co., Inc.	1,770
Bierrie & Co., Inc.	540
General Rubber Co.	10,425
Haldane & Co., Inc.	300
B. W. Henderson & Co., Inc.	250
Hood Rubber Co.	70
Lavino American & Asiatic Co.	1,200
Littlejohn & Co., Inc.	6,608
The Meyer & Brown Corp.	3,484
The Meyer & Brown Corp.	*280
H. Muehlstein & Co., Inc.	480
Poel & Kelly, Inc.	550
Raw Products Co.	440
Rogers Brown & Crocker Bros., Inc.	300
Chas. T. Wilson Co., Inc.	1,892

FEB. 5. By "Maihar," Far East.

	Cases
General Rubber Co.	1,350
Hood Rubber Co.	*128
Littlejohn & Co., Inc.	800
The Meyer & Brown Corp.	1,080
H. Muehlstein & Co., Inc.	1,050
Chas. T. Wilson Co., Inc.	110

FEB. 6. By "Blydendyk," Far East.

	Cases
H. A. Astlett & Co.	1,475
Robert Badenhop Corp. pkgs.	182
Bierrie & Co., Inc.	570
N. Diamond & Co., Inc.	295
General Rubber Co.	4,753
Haldane & Co., Inc.	500
B. W. Henderson & Co., Inc.	70
Lavino American & Asiatic Co.	528
Littlejohn & Co., Inc.	926
The Meyer & Brown Corp.	1,475
The Meyer & Brown Corp.	*51
H. Muehlstein & Co., Inc.	760
Poel & Kelly, Inc.	65
Rogers Brown & Crocker Bros., Inc.	295
Chas. T. Wilson Co., Inc.	207

FEB. 6. By "Pres. Monroe," Far East.

	Cases
H. A. Astlett & Co.	1,230
Robert Badenhop Corp. pkgs.	150
Baird Rubber & Trading Co., Inc.	50
Paul Bertuch & Co., Inc.	300
Bierrie & Co., Inc.	150
General Rubber Co.	3,943
Haldane & Co., Inc.	400
Lavino American & Asiatic Co.	250
Littlejohn & Co., Inc.	5,014
The Meyer & Brown Corp.	740
H. Muehlstein & Co., Inc.	1,690
Poel & Kelly, Inc.	700
Poel & Kelly, Inc.	*66
Rogers Brown & Crocker Bros., Inc.	864
Chas. T. Wilson Co., Inc.	291

FEB. 7. By "Cedarbank," Far East.

	Cases
H. A. Astlett & Co.	2,866
Robert Badenhop Corp. pkgs.	462
Baird Rubber & Trading Co., Inc.	742
Paul Bertuch & Co., Inc.	67
Bierrie & Co., Inc.	250
General Rubber Co.	15,094
Haldane & Co., Inc.	400
B. W. Henderson & Co., Inc.	150
Hood Rubber Co.	*239
Lavino American & Asiatic Co.	1,641
Littlejohn & Co., Inc.	6,663
The Meyer & Brown Corp.	3,102
The Meyer & Brown Corp.	*50
H. Muehlstein & Co., Inc.	590
Poel & Kelly, Inc.	1,575
Poel & Kelly, Inc.	*50
Raw Products Co.	930
Rogers Brown & Crocker Bros., Inc.	1,965
Rogers Brown & Crocker Bros., Inc.	*66
Chas. T. Wilson Co., Inc.	2,025

FEB. 7. By "Taiyo Maru," Far East.

	Cases
H. A. Astlett & Co.	†544
Littlejohn & Co., Inc.	†100

FEB. 8. By "City of Adelaide," Far East.

	Cases
H. A. Astlett & Co.	3,010
Robert Badenhop Corp. pkgs.	846
Baird Rubber & Trading Co., Inc.	770
Baird Rubber & Trading Co., Inc.	*250
Bierrie & Co., Inc.	600
N. Diamond & Co., Inc.	50
General Rubber Co.	13,729
Haldane & Co., Inc.	250
B. W. Henderson & Co., Inc.	400
Hood Rubber Co.	50
Lavino American & Asiatic Co.	310
Littlejohn & Co., Inc.	4,134
The Meyer & Brown Corp.	2,711
The Meyer & Brown Corp.	*200
H. Muehlstein & Co., Inc.	1,120
Poel & Kelly, Inc.	700
Raw Products Co.	500
Rogers Brown & Crocker Bros., Inc.	1,425
Rogers, Brown & Crocker Bros., Inc.	*250
Chas. T. Wilson Co., Inc.	2,782

FEB. 8. By "City of Perth," Far East.

	Cases
H. A. Astlett & Co.	4,076
Robert Badenhop Corp. pkgs.	885
Baird Rubber & Trading Co., Inc.	687
Bierrie & Co., Inc.	350
N. Diamond & Co., Inc.	50
General Rubber Co.	14,805
Haldane & Co., Inc.	350
B. W. Henderson & Co., Inc.	300
Lavino American & Asiatic Co.	470
Littlejohn & Co., Inc.	8,232
The Meyer & Brown Corp.	3,049
The Meyer & Brown Corp.	*950
H. Muehlstein & Co., Inc.	290
Poel & Kelly, Inc.	1,535
Raw Products Co.	362
Rogers Brown & Crocker Bros., Inc.	1,756
Chas. T. Wilson Co., Inc.	2,730

FEB. 8. By "Malayan Prince," Far East.

	Cases
H. A. Astlett & Co.	3,032
Robert Badenhop Corp. pkgs.	1,226
Baird Rubber & Trading Co., Inc.	1,536
Bierrie & Co., Inc.	634
General Rubber Co.	7,950
N. Diamond & Co., Inc.	202
Haldane & Co., Inc.	300
Haldane & Co., Inc.	*200
B. W. Henderson & Co., Inc.	165
Hood Rubber Co.	*167
Lavino American & Asiatic Co.	495
Littlejohn & Co., Inc.	6,796
The Meyer & Brown Corp.	2,172
H. Muehlstein & Co., Inc.	550
Poel & Kelly, Inc.	640
Poel & Kelly, Inc.	*70
Raw Products Co.	150
Rogers Brown & Crocker Bros., Inc.	1,110
Rogers Brown & Crocker Bros., Inc.	*66
Chas. T. Wilson Co., Inc.	1,272

	Cases
FEB. 8. By "Steel Navigator," Far East.	
H. A. Astlett & Co.	5,258
Robert Badenhop Corp.	802
Baird Rubber & Trading Co., Inc.	801
Bierrie & Co., Inc.	500
General Rubber Co.	14,526
Haldane & Co., Inc.	179
Lavino American & Asiatic Co.	523
Littlejohn & Co., Inc.	3,761
The Meyer & Brown Corp.	1,231
The Meyer & Brown Corp.	*50
H. Muehlstein & Co., Inc.	1,700
Poel & Kelly, Inc.	450
Rogers Brown & Crocker Bros., Inc.	595
Rogers Brown & Crocker Bros., Inc.	*110
Chas. T. Wilson Co., Inc.	785
FEB. 9. By "City of Rangoon," Far East.	
H. A. Astlett & Co.	668
Bierrie & Co., Inc.	168
General Rubber Co.	1,176
B. W. Henderson & Co., Inc.	250
Hood Rubber Co.	93
Lavino American & Asiatic Co.	125
Littlejohn & Co., Inc.	1,934
The Meyer & Brown Corp.	541
Chas. T. Wilson Co., Inc.	555
FEB. 10. By "Clan Murdock," Far East.	
General Rubber Co.	296
Haldane & Co., Inc.	32
B. W. Henderson & Co., Inc.	150
Littlejohn & Co., Inc.	150
The Meyer & Brown Corp.	300
Chas. T. Wilson Co., Inc.	80
FEB. 10. By "Haleric," Far East.	
H. A. Astlett & Co.	244
Bierrie & Co., Inc.	112
General Rubber Co.	296
Haldane & Co., Inc.	198
Hood Rubber Co.	*250

* Arrived at Boston.
† Arrived at Los Angeles.

	Cases
Littlejohn & Co., Inc.	2,294
The Meyer & Brown Corp.	70
The Meyer & Brown Corp.	*224
Poel & Kelly, Inc.	50
Rogers Brown & Crocker Bros. Inc.	150
Chas. T. Wilson Co., Inc.	770
FEB. 10. By "Mentor," Far East.	
H. A. Astlett & Co.	662
Robert Badenhop Corp.	350
Baird Rubber & Trading Co., Inc.	271
Bierrie & Co., Inc.	333
N. Diamond & Co., Inc.	170
General Rubber Co.	4,595
Haldane & Co., Inc.	96
B. W. Henderson & Co., Inc.	200
Hood Rubber Co.	*135
Lavino American & Asiatic Co.	298
Littlejohn & Co., Inc.	1,997
The Meyer & Brown Corp.	500
The Meyer & Brown Corp.	*51
H. Muehlstein & Co., Inc.	296
Poel & Kelly, Inc.	190
Rogers Brown & Crocker Bros., Inc.	249
Rogers Brown & Crocker Bros., Inc.	*120
Chas. T. Wilson Co., Inc.	406
FEB. 11. "Pres. McKinley," Far East.	
H. A. Astlett & Co.	†1,675
Littlejohn & Co., Inc.	†442
The Meyer & Brown Corp.	†300
H. Muehlstein & Co., Inc.	†390
FEB. 12. By "Megantic," Europe.	
Littlejohn & Co., Inc.	140
FEB. 13. By "Maasdam," Europe.	
H. A. Astlett & Co.	175
FEB. 13. By "Nortonian," Europe.	
General Rubber Co.	70
Littlejohn & Co., Inc.	215
FEB. 14. By "City of Singapore," Far East.	
H. A. Astlett & Co.	528
Robert Badenhop Corp.	328

	Cases
Bierrie & Co., Inc.	474
Hood Rubber Co.	*85
Littlejohn & Co., Inc.	2,150
The Meyer & Brown Corp.	1,247
H. Muehlstein & Co., Inc.	1,450
Rogers Brown & Crocker Bros., Inc.	206
Chas. T. Wilson Co., Inc.	512
FEB. 14. By "Lepanto," Far East.	
Baird Rubber & Trading Co., Inc.	200
FEB. 15. By "Memphis City," Far East.	
H. A. Astlett & Co.	2,550
Baird Rubber & Trading Co., Inc.	300
Baird Rubber & Trading Co., Inc.	*60
Bierrie & Co., Inc.	250
Haldane & Co., Inc.	206
B. W. Henderson & Co., Inc.	250
Littlejohn & Co., Inc.	3,854
The Meyer & Brown Corp.	1,025
The Meyer & Brown Corp.	*500
H. Muehlstein & Co., Inc.	1,650
Rogers Brown & Crocker Bros., Inc.	425

Africans

JAN. 21. By "City of Newcastle," Far East.	
Littlejohn & Co., Inc.	12

Balata

JAN. 18. By "Dominic," South America.	
Paul Bertuch & Co., Inc.	43
JAN. 25. By "Polycarp," South America.	
Paul Bertuch & Co., Inc.	16
FEB. 9. By "Swinburne," South America.	
Paul Bertuch & Co., Inc.	24

Rubber Latex

FEB. 6. By "Pres. Monroe," Far East.	
Rogers Brown & Crocker Bros., Inc...gals.	60

Paras and Caucho

	Fine Cases	Medium Cases	Coarse Cases	Caucho Cases	Miscel. Cases
JAN. 18. By "Dominic," South America.					
H. A. Astlett & Co.	201	3	175	108	....
Paul Bertuch & Co., Inc.	12	....	....	....	....
JAN. 25. By "Berury," South America.					
H. A. Astlett & Co.	33	2	149	82	....
Littlejohn & Co., Inc.	282	....	....	154	....
The Meyer & Brown Corp.	158	....	....	....	....
JAN. 25. By "Polycarp," South America.					
H. A. Astlett & Co.	159	....	45	65	....
Paul Bertuch & Co., Inc.	562	....	....	....	....
General Rubber Co.	665	4	65	34	....
Littlejohn & Co., Inc.	344	....	12	....	....
The Meyer & Brown Corp.	1,208	....	....	....	....
FEB. 8. By "Steel Navigator," South America.					
General Rubber Co.	....	....	41	....	....
FEB. 9. By "Swinburne," South America.					
H. A. Astlett & Co.	382	1	22	163	....
General Rubber Co.	253	....	66	8	....
Littlejohn & Co., Inc.	428	....	45	....	....
The Meyer & Brown Corp.	747	....	....	....	....
FEB. 13. By "American Legion," South America.					
Paul Bertuch & Co., Inc.	70	....	....	....	....

Netherland East Indies Exports

	Total Jan.-Oct. 1927	1928	Long Tons 1928 Oct.
Java and Madura	45,413	48,927	5,313
Sumatra E. C.	63,351	69,536	8,256
Other N. E. I.*			
Atjeh and Dep.	3,214	3,359	477
Riouw and Dep.	9,298	8,051	839
Djambi	29,904	28,338	2,256
Palembang	17,648	15,154	1,214
Lampongs District	2,186	2,516	225
Benkoelen	61	41	4
Sumatra W. C.	1,256	937	82
Tapanoeli	6,017	4,808	563
Banka and Dep.	1,583	598	42
Billiton	137	87	14
W. Borneo	21,106	17,649	2,216
S. and E. Bor.	21,770	21,417	2,178
Menado	188	171	12
Celebes and Dep.	7	31	.....
Amboino	35	26	4
Total*	114,410	103,183	10,126
Grand total	223,174	221,646	23,695

*Exports from "Other N. E. I." consist largely of native rubber of approximately 33⅓ per cent necessary for moisture.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Amazon Valley Exports

Exports of crude rubber from the Amazon Valley in Nov. 1928, totaled 1,790 long tons, with destinations declared as follows: United States, 1,083; Europe, 642, and Southern Brazil, 65 long tons.

Stocks at the end of November were: Para, 2,663 long tons in first hands, 1,173 in second hands; Manaos, 517 first and 739 second.

Ceylon Rubber Exports

January 1 to November 30, 1928

	Tons
To United Kingdom	11,709.53
Continent	4,511.71
Australia	1,105.37
America	32,237.61
Egypt	13.00
Africa	26.14
India	23.66
Japan	124.99
Other countries in Asia	6.60
Total	49,758.61
For the same period last year	51,268.50

Annual Exports, 1921-1927

	Tons
For the year 1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14
1921	40,210.31

French Thrifty Tire Users

As indicating that the French are more thrifty than the British in the use of tires, it is stated that tires of the same section carry more weight in England than those in France, the difference being on the average equal to the fitment of one size larger. Thus a 4.40 in. section tire is fitted in England to cars weighing as much as 2,050 lbs., whereas in France the heaviest car with such a tire is one weighing 1,575 lbs. Road conditions may account somewhat for the difference, but British tire users see in the French choice a wise preference for comfort and mileage.

Rubber Questionnaire

Fourth Quarter 1928*

Reclaimed Rubber	Long Tons: Inventory at End of Quarter	Production	Shipments	Consumption
Reclaimers solely (7)	5,785	21,934	19,450	3
Manufacturers who also reclaim (22)	9,439	30,891	9,450	21,228
Other manufacturers (73)	6,500	......	.....	16,467
Totals	21,724	52,825	28,900	37,698

Scrap Rubber	Long Tons: Inventory	Consumption	Due on Contract
Reclaimers solely (7)	42,153	37,763	12,032
Manufacturers who also reclaim (19)	25.690	28,804	18,573
Other manufacturers (21)	1,026	......	......
Totals	68,869	66,567	30,605

TONS OF RUBBER CONSUMED IN RUBBER PRODUCTS AND TOTAL SALES VALUE OF SHIPMENTS

Products	Crude Rubber Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and Tire Sundries:		
Automobile and motor truck pneumatic casings	75,189	$128,521,000
Automobile and motor truck pneumatic tubes	12,961	18,480,000
Motorcycle tires (casings and tubes)	57	334,000
Bicycle tires (single tubes, casings and tubes)	228	867,000
Aeroplane casings and tubes	21	76,000
Solid and cushion tires	2,879	4,862,000
All other solid tires	63	292,000
Tire sundries and repair materials	1,574	5,283,000
Totals	92,972	$158,715,000

Products	Crude Rubber Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Other Rubber Products:		
Mechanical rubber goods	4,501	$23,629,000
Boots and shoes	4,631	29,595,000
Insulated wire and insulating compounds	997	11,384,000
Druggists' sundries, medical, surgical rubber goods	472	2,133,000
Stationers' rubber goods	324	645,000
Bathing apparel	140	167,000
Rubber clothing	344	2,559,000
Automobile fabrics	209	1,629,000
Other rubberized fabrics	777	3,249,000
Hard rubber goods	193	2,329,000
Heels and soles	1,299	5,690,000
Rubber flooring	292	1,268,000
Sporting goods, toys and novelties	307	1,421,000
Miscellaneous, not included in any of the above items	731	3,076,000
Totals	15,217	$88,774,000
Grand totals—all products	108,189	$247,489,000

INVENTORY OF RUBBER IN THE UNITED STATES AND AFLOAT

On Hand	Long Tons: Plantation	Para	All Other	Totals
Manufacturers	45,906	2,054	1,342	49,302
Importers and dealers	13,010	780	779	14,569
Totals on hand	58,916	2,834	2,121	63,871
Afloat				
Manufacturers	14,626	...	...	14,626
Importers and dealers	55,619	422	5	56,046
Totals afloat	70,245	422	5	70,672

*Number of rubber manufacturers that reported data was 154; crude rubber importers and dealers, 46; reclaimers (solely), 7; total daily average number of employes on basis of third week of October, 1928, was 160,493.

It is estimated that the reported grand total crude rubber consumption and the grand total sales value figures to be approximately 92 per cent; the grand total crude rubber inventory and afloat figures 95 per cent; the reclaimed rubber production 93 per cent, reclaimed consumption 73 per cent and reclaimed inventory 78 per cent of the total for the entire industry. *Compiled from statistics supplied by the Rubber Association of America, Inc.*

Radio for Ford

The Federal Radio Commission has been petitioned by Henry Ford for a short-wave channel for communication with stations he is erecting in South America. He already has licenses for four stations in Dearborn, Mich., which have been used principally for aviation experimental work. It is believed that the desire for communication is a forerunner of airplane service between Detroit and South America, the safety of such routes being increased by the use of the radio.

Tire Production Statistics

	High Pressure Pneumatic Casings — All Types: Inventory	Production	Total Shipments	Cord: Inventory	Production	Total Shipments
1927	....	48,331,311	48,052,414	....	21,527,278	21,741,962
1928						
January	7,461,923	4,018,267	4,045,842	3,605,064	1,684,750	1,496,047
February	8,790,709	4,772,276	3,773,544	4,394,561	1,697,498	1,244,812
March	9,291,516	5,113,994	4,298,551	4,355,309	1,564,346	1,302,644
April	9,537,796	4,633,308	4,358,831	4,331,499	1,307,759	1,347,854
May	9,767,754	5,069,233	4,842,513	4,152,775	1,404,097	1,570,710
June	9,121,776	5,019,472	5,338,056	3,362,861	1,345,857	1,812,907
July	8,368,358	4,873,716	5,924,156	3,039,349	1,506,228	2,207,086
August	7,514,290	5,601,856	6,302,258	2,465,358	1,903,345	2,416,386
September	7,323,645	5,101.187	5,358,728	2,339,798	1,853,887	1,990,535
October	8,640,356	5,494,846	4,287,556	2,834,193	2,035,898	1,596,081
November	9,434,003	4,556,094	3,748,692	3,197,060	1,664,024	1,305,186
December	10,217,708	4,203,624	3,443,210	3,580,576	1,434,529	1,061,132

	Balloon Casings: Inventory	Production	Total Shipments	Solid and Cushion Tires: Inventory	Production	Total Shipments
1927	....	26,037,452	25,111,903	....	558,030	558,007
1928						
January	3,656,537	2,377,299	2,489,391	161,329	36,279	33,797
February	4,173,493	3,021,548	2,500,013	156,790	36,328	38,715
March	4,700,534	3,516,480	2,967,476	156,424	42,950	44,665
April	4,983,023	3,309,351	2,983,454	154,477	43,255	42,145
May	5,419,093	3,658,349	3,235,236	153,205	46,606	47,604
June	5,587,566	3,658,508	3,486,748	153,925	48,614	48,426
July	5,215,331	3,358,203	3,658,636	150,770	45,792	48,081
August	4,986,800	3,678,139	3,814,016	147,350	51,679	52,334
September	4,935,836	3,220,369	3,327,028	150,500	42,619	43,965
October	5,767,229	3,443,334	2,668,049	153,126	46,590	45,044
November	6,192,556	2,875,529	2,430,203	150,941	35,760	37,138
December	6,594,978	2,761.109	2,371,732	152,120	31,751	30,688

	High Pressure Inner Tubes: Inventory	Production	Total Shipments	Balloon Inner Tubes: Inventory	Production	Total Shipments
1927	....	27,398,535	29,528,108	....	25,718,529	25,143,821
1928						
January	5,328,071	1,669,894	2,014,744	4,408,235	2,411,124	2,539,535
February	5,941,626	1,949,539	1,470,668	5,046,021	3,221,756	2,602,362
March	6,071,983	1,740,238	1,442,162	5,782,551	3,683,017	2,856,342
April	6,044,843	1,628,576	1,459,826	6,434,307	3,366,957	2,815,778
May	6,220,912	1,680,621	1,713,411	7,055,801	3,695,296	3,011,432
June	5,558,455	1,661,897	2,168,337	7,311,204	3,553,191	3,184,056
July	4,435,798	1,764,761	2,970,017	6,794,803	3,240,455	3,576,465
August	3,833,201	2,783,115	3,357,277	6,614,884	3,474,338	3,655,301
September	3.673,789	2,544,561	2,427,444	6,483,804	2,782,759	2,938,309
October	4,525,109	2,469,142	1,881,663	6,938,958	2,727,943	2,365,093
November	4,952,973	1,929,320	1,512,810	6,867,159	2,268,410	2,238,347
December	5.037,716	1,434,227	1,331,607	7,049,748	2,453,744	2,312,203

	Cotton and Rubber Consumption — Casings, Tubes, Solid and Cushion Tires: Cotton Fabric Pounds	Crude Rubber Pounds
1927	177,979,818	463,661,466
1928		
January	16,039,819	43,709,438
February	16,923,607	46,468,050
March	18,853,824	48,897,275
April	18,310,791	43,700,630
May	19,167,606	51,061,030
June	19,646,494	53,158,592
July	20,947,405	47,128,308
August	21,853,756	62,224,046
September	17,796,599	55,351,235
October	20,294,517	58,301,907
November	17,037,313	48,818,977
December	15,372,667	41,603,912

Rubber Association figures representing 75 per cent of the industry.

Tire Repair Hints

Many tire repair vulcanizers who are troubled with "blowholes," etc., would have much less grief were they always mindful about applying screw or other pressure often or steadily while the rubber is flowing. Where clamping and the open heat cure are factory practice, a better product is more likely to result if the mold be heated after cold pressing and tightening of the bolts begun after the rubber reaches a plastic condition. A common trouble known as air marking is said to be caused after vulcanization and after mold pressure is released. It is ascribed to uneven shrinking of the rubber in the mold during cooling. The obvious remedy is to empty the molds promptly and before shrinking can start.